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RESPONSE TO COMMENTS FOR ZONE J DRAFT RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT PART ONE DATED 24 APRIL 2000, ZONE J ECO SCREENING LEVELS MEMORANDUM DATED 25 JANUARY 2001, AND ZONE J SCOPING PACKAGE FOR WORK PLAN ADDENDUM DATED 11/21/2001

ENSAFE INC.

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA
CTO-0154

RESPONSE TO COMMENTS FOR:

ZONE J DRAFT RCRA RFI REPORT - PART ONE
(April 24, 2000)

ZONE J ECO SCREENING LEVELS MEMORANDUM
(January 25, 2001)

ZONE J SCOPING PACKAGE FOR WORK PLAN
ADDENDUM *(April 4, 2001)*

Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA

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November 21, 2001

Letter to Henry Shepard (NAVFACENGCOM) dated June 19, 2000 from Mihir Mehta (SCDHEC). Includes memorandum from Michael Danielson to Mehta dated May 31, 2000 and memorandum from Susan Byrd dated June 12, 2000. Comments in reference to the Zone J Draft RCRA RFI Report-Part One.

Michael Danielson General Comments:

1.) The Zone G, H, and I Reports are incomplete and therefore unapproved. The Department has requested that additional fieldwork be done on all three RFIs to complete site characterization. The fact that the reports are incomplete is further demonstrated in the text as stated, "no groundwater samples were taken at [SWMUs 21, 54, 81, and AOCs 555, and 556], but the soil-to-surface water path is valid". The much needed additional work on the individual Zone RFIs will help to complete the subsequent Zone J document. The Navy must plan to take additional samples to address these areas. Therefore the Zone J document is, consequently, also incomplete and is pre-mature to be submitted at this time.

Response:

The present strategy at CNC requires CH2M-Jones to provide site close out of all terrestrial sites and EnSafe be responsible for Zone J through the characterization of the contamination in the remainder of the sewer system, sediments beyond the high water mark and water bodies. The present strategy for Zone J is to:

- **evaluate data collected on point of entry effluent samples (both point and non-point sources)**
- **determine if results show a linkage to upland terrestrial sites**
- **discuss hydrodynamics of Zone J water bodies**
- **show contribution from non-CNC sources**
- **provide reference concentrations**
- **propose a COPC refinement of results**
- **present a Screening Level Ecological Risk Assessment (SLERA) on effluent, sheet flow, groundwater migration pathway, and sediment and surface water COPCs**

It is anticipated that a Point of Entry Effluent Sampling Work Plan, Effluent Evaluation Report, COPC Refinement Report and a SLERA will be the document deliverables detailing the progress of the proposed strategy. The trustees for Zone J will be involved throughout implementation of the strategy and it is expected that Scientific Management Decision Points (SMDP) will be made to redirect the strategy when needed. Once EnSafe determines that a linkage to an upland site is probable, the continued investigation of that site will be the responsibility of CH2M-Jones.

2.) Since the previous RFIs were submitted using SSLs based on a DAF of 20, what effect will that have on the results of the RFIs when they are re-calculated using more appropriate site specific DAFs.

Response:

The present strategy for completing terrestrial unit close out on the remaining RFIs is the responsibility of CH2M-Jones. If the Point of Entry Effluent Sampling identifies a possible link, the COPC in question will be re-evaluated along with upland site close out requirements.

3.) The Zone J document, as submitted, does not include any conclusions or recommendations, which makes the document incomplete and unable to be approved.

Response:

The Zone J RFI Part One document provided a preliminary presentation of a screening level problem formulation, ecological effects evaluation , exposure estimates, and risk calculations on sediment and surface water samples collected from Charleston water bodies that may be influenced by the CNC. The strategy for the Part One report was to concentrate on the sediment and surface water results, but subsequent to the submittal of the report, a new strategy has been proposed by the CNC BCT project team where focus lies with identification of upland source linkage with possible migration pathways to Zone J water bodies. As stated in the response to Comment #1, this new strategy will evaluate the various migration pathways, data collected from sampling events, the development of a comprehensive COPC list for Zone J, and a SLERA where a SMDP is likely to occur. At that point the strategy will be directed to complete the RFI process where conclusions and recommendations can be made.

4.) The Department understands that the Cooper River is a dynamic system. The Navy has directly discharged sewage, storm water, sand blast grit and paint flakes, paint operation wastes, etc. and also had accidental releases into the surrounding water bodies. The Navy had not been the only party to induce contaminants into the River, but at the same time the Navy needs to stand up and take responsibility for past operations that may have contaminated the Cooper River, as well as Noisette Creek and Shipyard Creek. The Navy must take great care to properly characterize all of the water bodies and sediments stated in the Zone J report with sediment transport and water flow studies.

The recent sampling locations are a start but must be refined to complete the proper sediment and surface water sample locations adjacent to outfalls and other possible release points.

Response:

The implementation of the Point of Entry Effluent Sampling Work Plan will address outfall release points concerns.

Specific Comments:

5.) Page 1-3, Section 1-1, Site Investigation Background and Strategy, 3rd paragraph
This paragraph states that previous efforts to provide risk managers with meaningful surface water data and contaminant distributions have proven unsuccessful. The text states a problem but does not offer any alternatives proposed to correct this situation. Please explain.

Response:

The Effluent Evaluation Report will provide a section on the hydrodynamics of the Charleston estuary system that will provide contaminant distribution. The section will provide an overview of the following:

- **tidal hydrodynamics based on published literature and ongoing studies, including the hydrodynamic and water quality modeling conducted by SCDHEC using WQMAP model**
- **detailed information regarding tidal current distribution in the Zone J water bodies**
- **results of field data in evaluating the hydraulics at Noisette Creek**
- **evaluate near-field mixing zone**
- **evaluate far-field transport and tidal excursion**
- **evaluate sediment deposition and transport process**

6.) Page 1-9, Site Map
The site map does not provide correlations of sampling locations with outfalls associated with the Navy Base or outfalls of the Navy's neighbors. Please provide a map showing all outfall locations.

Response:

The Point of Entry Effluent Sampling Work Plan provides detailed maps of all drainage basins established at CNC, the outfalls associated with them, and the locations of the reference samples to be collected. The RFI Part One sample locations will be incorporated into the SLERA Report to show correlations to outfall locations.

7.) Page 2-5, Section 2.2.1, development impacting the Cooper River, 1st paragraph
This paragraph states the mean flow into the Pinopolis Dam but does not explain how the Charleston Harbor has been affected. Please explain.

Response:

Rediversion of freshwater back to the Santee River has reduced the seasonal influences of freshwater discharge from the Pinopolis Dam upon Charleston Harbor. This affects both salinity and tidal currents in the harbor. Estuary hydrodynamics reflect more of a tidal nature than prior to the 1985 rediversion, allowing estuarine waters to move further upstream. Salinity in the harbor has increased, and shoaling/sedimentation resulting from the freshwater flow has been reduced. However, freshwater flow through the Pinopolis Dam

is still approximately ten times greater than prior to that in 1942 (10 cubic meter/second).

8.) Page 2-7, Section 2.2.2, Other Investigations in the Cooper River
The text states that the USACE collected 11 pre-dredge samples in 1994 and 17 samples in 1997 from Charleston Harbor. There is no indication of where these sampling locations, analytical parameters or the analytical results may be found. Please provide a figure indicating the sample locations and a table listing the analytes tested for, and found, in the referenced pre-dredge samples.

Response:

EnSafe is currently working with the U.S. Army Corps of Engineers (USACE) in locating the referenced reports. Sample location maps and tables listing analytes tested for and detected will be included in the Effluent Evaluation Report where possible.

9.) Page 2-9, Section 2.2.2, Other Investigations in the Cooper River, Contaminants
This section states the type of analysis but does not show where samples were located. Please provide the sample locations on a map/figure.

Response:

Sample location maps provided in *A Physical and Ecological Characterization of the Charleston Harbor Estuarine System (Marine Resource Division, South Carolina Wildlife and Marine Resources Department, May 1990)* will also be provided in the SLERA Report describing past studies in the Charleston Harbor water bodies.

10.) Page 2-12, Section 2.3.2, Other Shipyard Creek Investigations, 4th paragraph
The text refers to Site 5 but does not indicate where Site 5 is located. Please provide a figure indicating the location of Site 5.

Response:

EnSafe is currently working with the USACE in locating the referenced report *(Biological and Chemical Assessment of Sediments from Proposed Dredge Sites in the Charleston Harbor)*, specifically in reference to the Site 5 data . Sample location maps and tables listing analytes tested for and detected will be included in the Effluent Evaluation Report where possible.

11.) Page 2-18, Section 2.4, Noisette Creek
The text refers to Microtox but does not explain the meaning. Please explain/clarify.

Response:

Microtox ® is a metabolic inhibition test to assess acute toxicity of water, soil and sediment. Microtox is a registered trade mark of Azure Environmental of Carlsbad, California.

12.) Page 3-12, AOC 675/676/677 (Zone I)
This section states that a 495-gallon OWS is located north of the UST. Please explain if the OWS/tank is still in place. If the tank/OWS has been removed, please summarize results and reference the report.

Response:

CH2M-Jones is now responsible for all CNC RFI activities except for Zone J. CH2M-Jones should be contacted on the status of the 495 gallon OWS at AOC 675/676/677.

AOC 676
This section states that unknown materials were burned in the incinerator. Please explain where ash from incinerator operations was disposed.

Response:

Disposal of ash from incinerator operations at AOC 676 is part of the Zone I RFI. Questions regarding ash disposal should be directed to CH2M-Jones.

AOC 677
This section states that an OWS was used at this site. Please explain the status of the OWS and associated system. If this system has been removed, please summarize results and reference the report.

Response:

CH2M-Jones is now responsible for all CNC RFI activities except for Zone J. CH2M-Jones should be contacted on the status of the OWS at AOC 677.

Re: Responses to comments (dated June 12, 2000) for ecological aspects of Zone J Draft RFI Part 1: Charleston Naval Complex

Ms. Susan K. Byrd, Risk Assessor
Corrective Action Engineering Section
Columbia, South Carolina

Dear Ms. Byrd:

The following provides our responses to comments (dated June 12, 2000) from SCDHEC for the ecological aspects of Zone J Draft RFI Part 1: Charleston Naval Complex.

GENERAL COMMENTS:

1.) One background data set from Rathall Creek was used to establish background comparisons for all three Zone J water bodies. More detailed information should be provided describing the samples collected and how they are comparable to Zone J. A "control" data set may be more realistic for comparison to the Cooper River samples since naturally occurring levels of inorganics would be nearly impossible to attain, and offsite organic contaminants are present. Strategic and localized sampling may help alleviate some of these problems.

Response:

The Zone J Point of Entry Effluent Sampling Work Plan proposes the collection of off-site non-point source point of entry samples throughout the Charleston water bodies area in an effort to establish a dataset for the determination of reference concentrations. These sample locations were suggested by local municipalities and represent a cross section of typical landuse (both industrial and residential) classifications. The CNC BCT project team will decide on the appropriate reference concentration determination in which to compare on-site effluent data sets.

2.) The references text states that this document contains the first two steps of EPA's ERA guidance; however, the report seems to include detailed receptor specific modeling. Since this is not the "typical" CNC Zone RFI report, more information should be provided to link contaminant migration from a SWMU or AOC to the water body. In a "normal" RFI, this information would have been obtained prior to submitting the ERA. Generic information is given regarding SWMUs or AOCs with similar contaminants present; however, the levels detected and how they are migrating to Zone J is not presented. Please provide enlarged maps and figures that show the relationships between the sites and Zone J.

Response:

The Effluent Evaluation Report will provide maps and figures to show the relationships between the sites and Zone J water bodies. Receptor-specific modeling was included in the Draft RFI Report Part One and is normally part of the Step 3 process. The receptor specific

modeling will be developed once Steps 1 and 2 are fully completed.

3.) The Zone L RFI Map shows numerous different outfalls; however, the text only refers to four along the edge of Zone E. Please clarify why all outfalls were not evaluated during the Zone J assessment, and please provide an enlarged map showing the outfall locations in relation to the samples collected from Zone J. Any additional potential migration routes to Zone J such as ditches or culverts should also be identified.

Response:

As part of the Zone J Point of Entry Effluent Sampling Work Plan, all storm water sewer lines (outfalls), ditches and culverts that pass through RCRA-listed SWMU/AOCs will be sampled to assess the sewer line migration pathway extent of contamination to Zone J water bodies. Maps and figures will be provided in the Effluent Evaluation Report to show the relationship to upland terrestrial units. Additional potential migration routes will also be identified as part of the SLERA.

4.) The report seems to focus primarily on the groundwater to surface water pathway. Please justify more clearly why the other pathways are not relevant for the SWMU/AOC specific discussions for each water body.

Response:

Please see Response to Comment #3 above.

5.) Figures presented in Appendix B should be separated for each water body so that scale can be enlarged. Many sample location points overlap, and exact location orientation can not be determined with the maps in Appendix B. Also, no map was provided showing the cumulative contamination at each sample location. GIS will help the resolve of this problem.

Response:

Revisions of the maps will be addressed in future deliverables. An example of the type of map to be used in future documents are in the Point of Entry Effluent Sampling Work Plan.

6.) A more detailed dredging map should be provided as well as a description of sample locations in relation to the dredging activities. Is not clear which samples from the Cooper River are in areas that are regularly dredged. Please show the dates of the most recent dredging activity along with the dates of sampling. This will give the reader a better understanding of sediment deposition and potential Navy Base influence.

Response:

EnSafe is currently working with the USACE in obtaining dredging activities information for the Charleston Harbor water bodies. The information gathered will be included in the

Effluent Evaluation Report.

7.) Since Zones L and K are not referenced on maps, please provide brief descriptions of each when first mentioned in the text.

Response:

Additional details regarding the descriptions of Zone L and K will be provided in the Effluent Evaluation Report.

8.) Table 3.1 reports maximum concentrations greater than the SSVs for antimony, DDE, PCB and many of the semivolatile organic compounds (e.g., dibenzo(a,h)anthracene). Please provide figures plotting sample locations in Appendix B.

Response:

The Navy acknowledges that Table 3.1 alone does not accurately display the distribution of sample locations and the corresponding chemical compounds that exceed regulatory limits. As part of the effluent sampling investigation and CH2M-Jones' overland flow to storm sewer lines and groundwater migration pathway evaluations, upland source linkage and Zone J COPCs will be presented in ArcView format where possible. An Arcview project is being created that will accurately determine regulatory exceedances of upland and Zone J sample data, and unique views can be created that will display the sample locations where exceedances exist. The CNC RCRA project has thousands of sample locations, and to provide all locations with corresponding exceedances that are easily readable will require the generation of numerous maps.

SPECIFIC COMMENTS

1.) Page 1-1, Paragraph 4 states, "...sediment and surface water samples collected as part of zone-specific investigations were sometimes analyzed for only the COPCs related to a specific source rather than a full scale analysis." The text goes on to say, on page 1-2, that the zone specific investigations are not complete, and therefore not all sources and potential COPCs are known. By limiting the analysis in Zone J, potential contamination may be overlooked.

Response:

For the next phase of the Zone J RFI, the Point of Entry Effluent Sampling Work Plan will sample effluent samples from stormwater sewer lines that run through RCRA listed SWMUs/AOCs and develop reference concentration values from off-site locations. Off-site and on-site samples will be analyzed for SVOCs, pesticides, PCBs, metals, and cyanide. As stated in the response to Michael Danielson General Comment #1, the new strategy of Zone J will evaluate the various migration pathways, data collected from all sampling events, development of a comprehensive COPC list for Zone J, and a SLERA Report where a SMDP is likely to occur.

2.) Page 2-1, Paragraph 1 refers to AOCs 500, 501 and 502. Please explain in more detail why these sites would not potentially impact Zone J. A map or figure may be helpful.

Response:

AOC 500, 501 and 502 are unexploded ordnance (UXO) sites located in the waters of the Cooper River. AOC 500 is located at the northwest end of Pier T in Zone J at a depth varying from 5 to 30 feet. The ordnance at AOC 500 consisted of two Mark 47 Torpex loaded depth bombs, which were dropped into the waters of the Cooper River from naval war ships on January 28, 1945. According to The Completion Report, Interim Measure for AOC 500, prepared by the Environmental Detachment Charleston: An area of approximately 300 feet by 300 feet adjacent to the end of Pier T on the CNC was searched April 1998. No ordnance was discovered during the search of the 66,928-ft^2 area. After completion of all site work and data review, conditions at the site were said to have no other potential UXOs within four feet from the river bottom at AOC 500. AOC 501 is an area approximately 400 feet x 1200 feet in the Cooper River located between Piers X and Y at a depth varying from 5 to 30 feet. The site is bordered by the west of the inner channel line in Zone J, the Groin Break Wall and Naval Degaussing Station. The ordnance at AOC 501 consist of two Mark 47 Torpex loaded depth bombs, which were dropped into the waters of the Cooper River from naval war ships on November 20, 1943. According to The Completion Report, Interim Measure for AOC 501, prepared by the Environmental Detachment Charleston: An area of approximately 400 feet by 1200 feet between Piers X and Y on the CNC was searched July 1998. No ordnance was discovered during the search of the 480,000-ft^2 area. After completion of all site work and data review, conditions at the site were said to have no other potential UXOs within four feet from the river bottom at AOC 501. AOC 502 is located at the southwest end of Pier G in Zone J at a depth varying from 5 to 35 feet. The ordinances at AOC 502 consist of three five inch shells, which were dropped into the waters of the Cooper River from naval war ships in September 1944. According to The Completion Report, Interim Measure for AOC 502, prepared by the Environmental Detachment Charleston: An area of approximately 300 feet by 300 feet adjacent to the Pier G on the CNC was searched April 1998. No ordnance was discovered during the search of the 78,506-ft^2 area. After completion of all site work and data review, conditions at the site were said to have no other potential UXOs within four feet from the river bottom at AOC 502. Therefore, although AOCs 500, 501 and 502 are identified within the boundaries of Zone J, there would not be a potential impact from these sites to the water bodies of Zone J.

3.) To help make the Zone J Draft RFI report a "stand alone" document, please provide more information regarding the organotins and PAHs detected in the 1992 USACE report. Please provide a figure showing the sample locations in relationship to the site and other Zone J samples collected.

Response:

EnSafe is working with the USACE in obtaining information related to the 1992 report. Additional information, including a figure of sample locations regarding organotins and

PAHs will be provided in the Effluent Evaluation Report.

4.) The Conceptual Site Model will be revised to provide more detail in later stages of the ERA process; therefore, please refer to the model in Figure 3-1 as a Preliminary Conceptual Site Model.

Response:

Figure 3-1 will be changed as suggested.

5.) Page 2-12, Section 2.3.2, refers to a toxicological study of effects to marine organisms in Shipyard Creek. Paragraph 1 states that only Site 5 was deemed applicable to the evaluation of Zone J. Please provide more information to show how this information correlates to Zone J and how it will be used in future evaluations.

Response:

EnSafe is currently working with the ACOE in obtaining information related to the Site 5 study. Information gathered on Site 5 will be reported in the Effluent Evaluation Report and how it correlates to the present Zone J investigation.

6.) Silver is noted on the map in Appendix B as being detected in eight locations at a greater concentration greater than the SSV. However, Table 3.1 shows the maximum concentration detected in both the Cooper River and Shipyard Creek as lower than the SSV. It appears from Table 3.1 that silver was not tested for in Noisette Creek samples. Please clarify.

Response:

The silver concentrations will be reviewed, and future tables and maps will clarify whether the concentrations exceed the SSV or not.

7.) The maps in Appendix B for DDD and DDT show widespread contamination at levels above the SSVs in all three water bodies but Table 3.1 reports that levels of these contaminants were greater than the SSV in Shipyard Creek only. Please clarify.

Response:

The DDD and DDT concentrations will be reviewed, and future tables and maps will be revised so to make it clear as to whether the concentrations exceed the SSV or not.

8.) Appendix B- Numerical values of SSVs are not consistently provided in the key of the COPC maps. Please include.

Response:

Where tables and/or maps are used to show exceedances of SSVs and other regulatory limits, the numerical values of the limits will be provided.

9.) Table 3.1- Not applicable (NA) is used in the SSV column for both contaminants that have not been detected and for contaminants that have been detected but have no available SSV in the literature. Perhaps alternative acronyms could be used to distinguish.

Response:

Different acronyms will be used to distinguish between those compounds not detected and those compounds that were detected but have no SSV.

Re: Responses to NOAA Comments on CHS Naval Complex Zone J Draft RFI Report Part 1, dated June 5, 2000

Re: Mr. Tom Dillon
U.S. Department of Commerce
National Oceanic and Atmospheric Administration

Dear Mr. Dillon:

The following provides our responses to comments (dated June 5, 2000) from NOAA for the ecological aspects of Zone J Draft RFI Part 1: Charleston Naval Complex.

Comments:

1. Screening tables in Chapters 3 and 7 are well done. Zone J was divided into three water bodies; Cooper River, Shipyard Creek and Noisette Creek. Screening tables were prepared for each water body for the SLERA (Chapter 3) and Baseline Problem Formulation (Chapter 7). Consider the following refinements.

    a. Screen dioxin/furan data by calculating WHO-based TEQs for fish, mammalian and avian wildlife and compare to EPA Region 4 screening value. Appendix D does report a TEQ calculation but appears to be based on maximum congener concentrations observed throughout the entire water body. While conservative, this approach has limited value in identifying stations of concern. Instead, TEQs should be calculated for each individual sample. Then, identify maximum and mean concentrations as well as number exceeding the screening value. Indicate why dioxin/furan analysis was conducted in Cooper River and Shipyard Creek but not in Noisette Creek.

Response:

The initial investigative approach for Zone J was to proceed with the collection of sediment and surface samples in Zone J water bodies to identify offshore contaminants of concern and not wait until all zone-specific investigations were complete. Since most zone investigations were ongoing, the analytical approach was to incorporate compounds from suspected sources The Cooper River and Shipyard Creek were thought to be suspected recipients of dioxin because of low-level dioxin detections at the mouth of Shipyard Creek. Noisette Creek was not suspected of receiving dioxin contamination; [but since the submittal of the Zone J RFI Part One Report, the ongoing zone investigations have not identified an upland source for any of the dioxin isomers. Therefore, the analysis of dioxin has not been proposed in the Point of Entry Effluent Sampling Work Plan]. However, since some sediment and surface samples have been analyzed for dioxin, TEQs for dioxin/furan compounds will be calculated for each individual sample, and results will be presented in the SLERA. Maximum and mean

concentrations will then be identified and compared to the screening value.

b. Recalculate ER-M quotients as the mean of 25 individual ER-M quotients (9 metals, 13 PAHs and 3 organics, DDT, DDE, total PCBs) rather than as currently expressed; a sum. (Distinguish between the two values by using mean or sum before ER-M quotient.) The recalculated mean ER-M quotients will allow one to compare directly to guidance offered by Long et al. as cited in my 2/22/00 memo. (Note: Preliminary recalculations were provided in a spreadsheet by Jay Cornelius on June 1.) Assuming these calculations were performed per Long et al., the pattern that emerges should help focus further Zone J evaluations. That pattern is described below.

(1) AOC 556 (Drydocks) samples have the highest (1.6-1.8) and most frequently elevated mean ER-M quotients. These results suggest, with a strong degree of certainty, that these sediments are highly toxic to aquatic organisms.

(2) Samples from AOC 556, SWMU 9 (Landfill), SWMU 54 (Grit Blasting Area) and AOC 699 (Zone L Storm Sewer Outfalls) have mean ER-M quotients > 0.6. Long et al. suggest samples with mean ER-M quotients >0.5 have a high degree of certainty of being toxic to aquatic animals.

(3) The remainder of samples from AOC 556, SWMU 9, SWMU 54, AOC 699, as well as 3 samples from Noisette Creek and both samples from AOC 555 (Drydocks) have mean ER-M quotients between 0.19 and 0.5. Long et al. suggest that sediment with mean ER-M quotients in this range may also be toxic to aquatic animals. However, the uncertainty associated with projections of toxicity, or lack thereof, are greatest for mean ER-M quotients in this range.

(4) Most of the Zone J sediment samples have low mean ER-M quotients in a range that Long et al. associates with minimal or no toxicity. In the Part 2 report, mean ER-M quotients should be calculated for the reference samples to better define the lower end of this site-specific exposure-response curve.

Response:

In the new strategy for Zone J, the ER-M quotients will be calculated to better define the exposure-response curve as suggested and presented in the SLERA deliverable.

2. Scale down and refocus the food web models. There is an over-reliance on food web models throughout the subject report. Detailed models for two receptors, great blue heron and blue mussel, are the exclusive basis for all risk characterization in Chapter 6. Results of the abiotic screen are ignored during risk characterization.

a) Heavy reliance on specific receptors early in the ERA process is contrary to EPA guidance. That guidance indicates that: 1) assessment endpoints are the first and primary focus of ERAs, 2) assessment endpoints in the Baseline Problem Formulation (Step 3) lead to measurement

endpoints in the Work Plan (Step 4 and 3) receptor species are selected last based on the endpoints, exposure pathways and presumed modes to toxicity. The subject report has reversed this process by selecting receptor species first. Assessment endpoints are never even mentioned.

Response:

The selection of receptor species will be revised per the above comments (and additional comments presented below). Assessment and measurement endpoints will be formulated and discussed in SLERA deliverable.

b) EPA guidance also suggests that simple, conservative food web models are appropriate during the Screening-Level ERA. However, both food web models used in the subject report are neither simple nor conservative (e.g., the use average concentrations, LOAELs and large body weights).

Response:

The models will be revised per this comment and additional comments below so they first use maximum concentrations, NOAELs and minimum (and/or site-specific) body weights for the selected receptor species. If the revised Hazard Quotients are greater than 1 for these initial models, the models may be revised to use less conservative assumptions (i.e., LOAELs, average concentrations, etc.) for comparison purposes.

c) The blue mussel model is probably not appropriate for assessing risks to the benthic community in the Charleston Harbor area. This non-native species is a filter-feeder. Its primary exposure pathway is the water column, not sediments. Assessing benthic impacts usually involves an infaunal sediment ingester such as amphipods (for toxicity testing) and/or deposit-feeding clams (for bioaccumulation bioassays). The proposed blue mussel model also ignores PAHs even though this class of compounds is a COPC at this site, a direct toxicant and known to cause adverse effects on mollusks.

Response:

A clam will be used instead of the blue mussel to evaluate benthic impacts. Additionally, PAHs will be evaluated for this pathway.

d) For the reasons cited above, and because results of the food web modeling appear to contribute little to decision making in Baseline Problem Formulation, suggest the blue mussel model be dropped in the Part 2 report. Consider modeling risks to fish.

Response:

Based on comments received by the USEPA, Region 4, the clam will be utilized instead of the blue mussel to evaluate this potential pathway. Additionally, risks to fish will also be modeled in the SLERA deliverable.

3. Reconnect Zone J data to potential sources of hazardous waste release. Many CNC site investigations stopped at the waters edge if discharge to the Cooper River, Noisette or Shipyard Creeks was suspected. These interrupted investigations were deferred to the Zone J RFI. Now that the Zone J nature and extent chemical data are available, it is time to reconnect these results to individual SWMUs/AOCs, especially those noted in comment 1 above.

   The Part 2 report should fully undertake the reconnection effort. This evaluation must also determine whether there are ongoing releases from the land-based sources to the Zone J sediments.

Response:

Please refer to response to Michael Danielson General Comment #1.

4. Clarify and re-evaluate background. Four background samples were collected at Rathall Creek off the Wando River. The four samples were probably averaged and this presumptive mean was used as background in refining Shipyard and Noisette Creek COPCs. The report then says these background samples are inappropriate for a large, heavily industrialized river like the Cooper River, so the highest concentrations reported for the four creek samples were used to refine Cooper River COPCs. This approach appears arbitrary. At a minimum, the background calculations require greater clarification (e.g., show individual sample results). A strong technical basis must be provided using a different background for the Cooper River. Otherwise, NOAA recommends using the Rathall mean as background for all CNC sediment samples.

Response:

At the May 2001 BCT project team meeting, EnSafe presented the conceptual approach for collecting effluent samples from CNC and reference samples from non-point-source locations offsite. The reference values would be compared to the CNC effluent discharge results for determination of COPCs. The approach was agreed upon by the project team, which decided that a scoping package would be presented to the BCT project team prior to submittal of the Point of Entry Effluent Sampling Work Plan to incorporate comments from SCDHEC. The scoping package was presented at the August 2001 project team meeting where a consensus was reached that a number of reference locations should come from areas off-site, as well as on-site locations that were not influenced by an AOC/SWMU. Eighteen reference samples will be collected from areas not influenced by CNC and are from watersheds very similar to the watershed discharging from CNC. A technical memorandum will be prepared by EnSafe on the statistical approach to the determination on the reference concentration values.

5. Other Comments

   a. Screening tables suggest grain size and organic carbon were not routinely measured. This is a significant data gap and should be discussed in the uncertainty section. Provide reporting units for organic carbon and grain size data. All future sediment samples must be analyzed for organic carbon and grain size (i.e., % sand, silt, clay).

Response:

The lack of grain size and organic carbon analyses will be discussed in the uncertainty section of the SLERA report. Additionally, all future sediment samples will be analyzed for organic carbon content and grain size.

b. Screen surface water and groundwater.

Response:

Zone J surface water data will be screened against ambient water quality criteria during the SLERA and groundwater data will be screened against ambient water quality criteria if effluent data identifies COPCs and upland source evaluations need to be completed.

c. In Appendix B, add figures for PCBs, dibenzo(a,h)anthracene, DDE. Revise the ER-M quotient figure when mean values are recalculated per comment 1b.

Response:

Figures will be added for PCBs, dibenzo(a,h)anthracene and DDE. The ER-M quotient figure will also be revised.

Re: Responses to comments (dated July 31, 2000) for ecological aspects of Zone J Draft RFI Part 1: Charleston Naval Complex

Re: Dann Spariosu, Ph.D.
Remedial Project Manager
U.S. EPA, Region 4
61 Forsyth Street, S.W.
Atlanta, Georgia 30303-3104

Dear Dr. Spariosu:

The following provides our responses to comments (dated July 31, 2000) from Region 4 of the U.S. Environmental Protection Agency for the ecological aspects of Zone J Draft RFI Part 1: Charleston Naval Complex.

GENERAL COMMENTS ON REPORT PREPARATION:

The general comments section contains comments on the preparation of the document and the general approach. The specific comments will be an evaluation of the evidence for eliminating specific constituents as chemicals of potential concern (COPCs).

1. No discussion was provided about the potential sources in Zone G. A mysterious source of silver appears to be coming from Zone G and entering the Cooper River based on a figure in Appendix B.

Response:

The intent of the Point of Entry Effluent Sampling, sheet flow, and groundwater migration pathway evaluations is to identify possible COPCs and then attempt to establish a linkage with possible upland terrestrial units. If one or more of the pathways identify silver as a COPC in the vicinity of Zone G, an evaluation of terrestrial units associated with Drainage Basins adjacent to Zone G will be undertaken.

2. Food-chain model results were never used to support a conclusion. The difficulty was the incorporation of diverse habitats into an average concentration.

Response:

Per the comments received from NOAA and the state of South Carolina, the food-chain models will be revised.

3. My recommendation is to look at individual areas with close association to the Naval Shipyard and where constituents may have an additive toxic effect based on the ERM quotient. First, there was the Cooper River. For the Cooper River areas of concern included the Drydocks (AOC 556), former abrasive blasting area (SWMU 54), and Zone

L stormwater outfalls including the base of Pier D (555-01 and 699-02) and base of Pier E (699-04) across from the former less-than-90-day hazardous waste accumulation area at SWMU 81. For Shipyard Creek I would like to see further investigation of the headwaters area with respect to the SWMU 9 landfill, AOC 654 leach field, and the SWMU 196 groundwater plume.

Response:

All SWMUs/AOCs will be evaluated either through the stormwater sewer lines, sheet flow or groundwater migration pathways, and where COPCs have been identified, data collected at upland sites will be further investigated to determine a possible linkage.

4. Noisette Creek generates less concern relative to the other water bodies. To finish the Noisette Creek investigation, I recommend that the association of contaminants of potential concern with potential sources be completed to ensure that current and future migration pathways contributing to sediment contamination will be adequately addressed by the remedies for Zones A and B. Sources of copper, lead, nickel, silver, and zinc have been identified. There are also elevated PAHs at the mouth of the creek for which no potential source has been identified.

Response:

A more detailed review of the COPCs for Noisette Creek and potential migration pathways will be conducted. EnSafe will be conducting storm water effluent sampling along Noisette Creek to identify possible COPCs. If COPCs are identified, EnSafe will evaluate upland terrestrial environmental data to identify a possible source to the effluent COPCs. If a source is identified, CH2M-Jones will be tasked to implement procedures to prevent the source from reaching Noisette Creek.

5. Four samples from SWMU 44 of Noisette Creek had missing data. SWMU 44 appears to have numerous chemicals of concern in soil. Without the samples from the drainage ditches, it might be difficult to evaluate this potential source. This data gap needs to be addressed or available data added.

Response:

Prior to the submittal of the point of Entry Effluent Sampling Work Plan, site reconnaissance was performed at all drainage basins to evaluate the storm water sewer and drainage ditch systems associated with the RCRA-listed SWMUs/AOCs. Site reconnaissance of SWMU 44 revealed drainage ditches that flow into storm water lines and a ditch that flows into Noisette Creek. Samples from all discharge points will be collected around SWMU 44, and the data will be evaluated for impact to Noisette Creek.

6. I do not agree with the use of average concentrations compared to ER-M or PEL values due to the tendency of averages to decrease as the spatial extent of the averaged stations increases. The distribution of the constituents is very important, especially when potential sources are implicated.

Response:

For the sedentary and shore-dwelling receptor species (benthic macroinvertebrates, wading birds and small mammals), average concentrations will not be used for comparison purposes. Instead, the data will be evaluated and grouped appropriately so that only the maximum concentration at the affected exposure point is utilized.

7. I have suggested several ways to address arsenic in Zone J sediments including examining the correlation of arsenic and iron in groundwater, examining the correlation between arsenic in sediment and grain size and organic carbon content, and taking a closer look at potential groundwater surface water transport pathways to the river and creeks.

Response:

Arsenic concentrations will be re-evaluated as suggested.

8. Several of the highest hits were near outfalls from the storm sewer system (Zone L). There needs to be a better discussion of where these outfalls drain and linking with potential sources.

Response:

The Effluent Evaluation Report will describe in detail all of the drainage basin areas associated with an AOC/SWMU, water bodies where storm sewer system effluent discharge, and possible sources.

9. My chemical-specific comments on data interpretation frequently include tentative identification of potential sources based on discussion in the report or sometimes merely based on proximity. The strength of these associations need to be evaluated in the revised report.

Response:

Potential sources for the contaminants of concern will be evaluated and discussed in greater detail in the Effluent Evaluation and SLERA Reports.

10. A description of the ecotoxicity of tin compounds in sediments should be added to the report.

Response:

A discussion of the ecotoxicity of tin compounds in sediments will be added to the SLERA report if tin is identified as a COPC .

11. Constituents do not have to be present at lower concentrations in the sediments than in the

nearby surface soils to implicate a potential source. The finer-grained, surficial contamination in soil can wash off into water bodies and accumulate in sediments. Sedimentation patterns can focus constituents associated with finer grained sediments into localized depositional areas.

Response:

This potential for localized depositional areas will be addressed in the SLERA report.

12. Constituents that might result in ecological risk should be included in the assessment even if the source cannot be clearly linked to the Naval shipyard. The purpose of looking at the sources is to ensure that remedies selected for the land-based zones are protective of Zone J. If the river is degraded for reasons other than the Shipyard, this might be important information for risk managers.

Response:

Constituents present in the Zone J water bodies that can not be linked to an upland terrestrial source to the Naval Shipyard will be discussed in the Effluent Evaluation and SLERA reports.

13. In Chapter 5.0 the screening-level assessment endpoints for bioaccumulative chemicals were chosen as piscivorous birds and benthic macrofauna. There was little discussion or justification for the choice of these assessment endpoints. Too much emphasis in the discussion was placed on the receptor species. The conclusions should be stated in terms of the assessment endpoints rather than in terms of the receptor species. The text should be modified to add a detailed justification of assessment endpoints and to shift the report emphasis from receptor species to assessment endpoints.

Response:

Per the comments of NOAA and the state of South Carolina, receptor species may be revised. In either case, the assessment and measurement endpoints will be described in greater detail and the emphasis switched from a detailed discussion regarding the receptor species to the effects on the assessment endpoint and addressed in the SLERA report.

14. The bioaccumulation assessment considered potential risks to piscivorous birds but did not consider potential risks to piscivorous mammals.

Response:

A representative piscivorous mammal that is on-site such as a raccoon or mink and representative to effects of COPCs identified will be added as a receptor species.

15. The lowest observable adverse effects levels (LOAELs) were estimated by multiplying the no observable adverse effects levels by 10. Specific values from the literature should be used when available, such as 12.8 for arsenic from the same study on the mallard used to

derive the NOAEL. Specific information is preferred over a generic assumption that the LOAEL is ten times greater than the NOAEL.

Response:

Multiplication of the NOAEL by 10 will only be used as a default value if chemical-specific information regarding a LOAEL cannot be found in the literature.

SPECIFIC COMMENTS ON REPORT PREPARATION:

1. *Section 3.2.1.2, Potential CNC Sources of COPC to the Cooper River, SWMU 38 (Zone A), Page 3-7.* The text on groundwater-to-surface water does not list arsenic, which was listed as a groundwater-to-surface water chemical on Table 3-2. Text and table need to be corrected for consistency.

Response:

Once the storm water sewer lines, sheet flow and groundwater migration pathway evaluations are complete, a detailed list of CNC upland sources linked to COPCs will be provided. For SWMU 38, if arsenic is linked to a migration pathway, it will be listed in both the table and text.

2. *Section 5.3, Toxicity Reference Values and Table 5-31.* Original citations should be included for toxicity reference values.

Response:

Future reports will show original citations when presenting TRVs.

3. *Section 6.3.3, Uncertainties in Exposure Estimates.* The bioaccumulation calculations for organic chemicals use a default value of 3 percent lipid content for clams. The text on Page 5-5, however, states that the blue mussel was selected because it had the highest lipid content–17.3 percent. The uncertainties section for exposure estimate falsely claims that, because the mussel had a high lipid content, the calculations were conservative. In actuality the calculations used a value of 3 percent lipids for the blue mussel instead of the actual 17.3 percent. For the text to be consistent with the calculations, the assumed lipid content for the calculations would have to be 17.3 percent.

Response:

Based on comments received from NOAA and the state of South Carolina, the blue mussel will be replaced by another benthic macroinvertebrate (such as a clam). The estimated lipid content of the new receptor species will be utilized in the equations.

4. *Section 7.1.1.1, Cooper River COPC Refinement - Inorganics.* Include a discussion for arsenic.

Response:

A comprehensive COPC refinement will be developed for the three Zone J water bodies and will include a discussion on arsenic if it is identified as a COPC.

5. *Section 7.1.1.1, Cooper River COPC Refinement - Inorganics.* The statement for chromium is incorrect. The SSV is incorrect in the first sentence for chromium.

Response:

The correct SSV for chromium is 52.3 mg/kg. The text is incorrect. In future reports, the correct screening values will be referenced.

6. *Section 7.1.3.3, Noisette Creek COPC Refinement - Organics.* Bis(2-ethylhexyl)phthalate is not discussed.

Response:

The Navy acknowledges that bis(2-ethylhexyl)phthalate was not discussed as a COPC in the Part One Report. Bis(2-ethylhexyl)phthalate was discussed as part of the PAHs discussion. Future reports will discuss individual constituents that are identified as a COPC.

CHEMICAL-SPECIFIC COMMENTS ON DATA INTERPRETATION:
COOPER RIVER

Antimony
Antimony is not widely spread at concentrations over its screening value. It is elevated above the screening level (HQ=1.93) at only one location (054M0004). This sample was located at the Zone E, SWMU 54 and Cross-connected Outfall 23. Zone 54 is the former abrasive blasting area for ships. Outfall 23 drains several buildings including the Zone E Machine Shop in Building 3. This area had the highest concentrations of antimony, lead and zinc plus high concentrations of several other metals. Because metals are especially elevated in SWMU 54, the area needs further investigation. Antimony should be part of a specific investigation of SWMU 54 along with the other metals mentioned. It probably would not drive an investigation of the abrasive blasting area solely on its own merits, since the maximum is below the ER-M.

Response:

Site-specific investigations are now the responsibility of CH2M-Jones. If antimony is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Arsenic
Arsenic is widely distributed in Zone J. 49 of 76 samples exceeded the screening value. The highest concentration is 22.2 mg/kg in CPRM0024, near Pier O. The background value for Rathall Creek is 21 mg/kg. The maximum hazard quotient (3.07) was not particularly high. There was no discernable pattern of contamination, except it appeared to be associated with the finer grained sediments. Several groundwater-to-surface water sources have been identified for

the Cooper River. The groundwater-to-surface water sources of arsenic, cadmium, copper, and mercury warrant further consideration. They are AOC 694, SWMU 38, SWMU 54, and AOC 671 on figure in Appendix B.

Zone K AOC 694, the former Naval Ammunition Depot on Clouter Island appears to be the most extensive. AOC 694 is the former Naval Ammunition Depot. Groundwater concentrations of arsenic, cadmium, copper, cyanide, mercury and silver exceeded AWQC screening criteria at AOC 694. The Depot is near AOC 695, the former electric locomotive. Sediment samples 695-01 and 695-02 were not particularly elevated in arsenic.

The discussion of SWMU 38 on Pages 3-7 and 3-8 did not mention arsenic. There appears to be contamination of copper, silver, DDD and DDT in shallow groundwater at SWMU 38, however, the travel time is projected to be 120 years. The inconsistency regarding arsenic should be checked.

SWMU 54 is the abrasive blasting area. Arsenic and copper were detected in SWMU 54 soils at levels exceeding soil screening values. The report stated that they may pose a risk to Zone J via the soil-to-surface water, via groundwater, pathway.

AOC 671 is a former metering house for aviation gasoline located between piers Q and R (CPR-25). Arsenic was consistently detected in groundwater at concentrations that exceeded the surface water criterion. The report suggested that the constant concentrations could indicate a stable flux into the system, which was described as most likely naturally occurring.

SWMU 12 is on Shipyard Creek but is mentioned due to its similarity. Arsenic, di-n-butylphthalate, and nickel were detected in groundwater at SWMU 12 at concentrations above their surface water screening values. The arsenic is detected in only one well located 600 feet away from Shipyard Creek. The report stated that it would be diluted and attenuated before reaching the creek. Arsenic was not associated with the fire-training activities of SWMU 12. The occurrence of arsenic in groundwater at SWMUs where there is no known source is different from the occurrence of arsenic in soils, such as at SWMU 54. Areas built on dredge fill may be subject to release of arsenic to groundwater when sediments from reducing environments are placed in suboxic environments on land. The prevalence of this geochemical phenomenon could be checked by noting whether elevated iron was co-located with the arsenic in groundwater.

Arsenic concentrations should be investigated further because the background concentration was also above the screening value. Both Zone J and background stations are relatively high compared to national distribution. NOAA's National Status and Trends Program (1984-1990) reported a value for arsenic they considered high in fine-grained sediment after sediments were adjusted for grain size by dividing the raw concentrations by the fraction of particles less than or equal to 64 um. A high concentration of 24 mg/kg was reported for a sediment at 4.6% TOC dry weight (NOAA, 1991). "High" NOAA concentrations are equal to the geometric mean plus one standard deviation on the log normal distribution (n=233) (O'Connor, 1990). NOAA's study concluded that the arsenic tended to be associated with the fine-grained sediments and with sediments high in organic carbon. Therefore, normalization of Zone J data by grain size and organic carbon content may reveal whether sediments are elevated due to natural variations in sediment properties or due to the identified potential sources.

Normalization with sediment grain size and organic carbon content may assist in either background comparison or evaluation of the pattern of detection. I would like to see a discussion or figure relating arsenic to grain size and organic carbon content. I would like the background to be normalized for these factors and then compared to give a more refined analysis of potential patterns. Even if arsenic appears within the range of background for the region, I would like to keep arsenic in as a COPC, even if it was not clearly contributed by the Navy, until it can be shown to have no unacceptable risk.

Response:

If arsenic is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Cadmium
Cadmium was detected above the screening value in only one sample. It is not an overall concern, just in the AOC 555 area of Zone E. Cadmium was detected at its highest concentration at the base of Pier D in Sample 555-01. Near AOC 555 is Outfall 27, which has a cross connect to Building 1119, the former galvanizing shop. Its toxicity might affect toxicity testing for chromium and other metals and PAHs in this area. It should not be eliminated from analysis or completely from the AOC 555 assessment, only it will not drive a biological test solely on its own merit. Of concern is the lack of soil or groundwater samples at AOC 555. Potential transport pathways or the need to remediate AOC 555 to protect Zone J cannot be evaluated.

Response:

Site-specific investigations are now the responsibility of CH2M-Jones and the CNC BCT team. If cadmium is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Chromium
Chromium concentrations were elevated at the base of Pier D in Samples 699-02 and 555-01 with concentrations of 230 mg/kg and 177 mg/kg, respectively. Chromium was also elevated in Sample 699-04 with a concentration of 151 mg/kg. Sample 699-04 is located at the base of Pier E near SWMU 81. Most of the open water Cooper River samples had low chromium concentrations–only slightly above screening values, if at all. Moderate concentrations (60.3 and 57.7 mg/kg) were detected at AOC 695, the former electric railroad, which is below water level.

AOC 555 is the substation at the base of Pier D. It is near Outfall 27, which crossconnects to Building 1119, the former galvanizing shop. No soil or groundwater samples were taken at AOC 555.

AOC 699 is the storm sewer system at CNC (Zone L). AOC 699 samples were taken at the base of storm sewer outfalls to Zone J. Groundwater investigations near the sewer lines of Zone E

revealed elevated concentrations of arsenic, copper, and chloroform. There was no mention in the report of a source of chromium. The sewer lines may represent a continuing source of contamination to Zone J.

Chromium was predicted to have risk to benthic fauna. Mean concentrations do not reflect the actual exposure to oysters and mussels because they include the center of the channel. The actual risk will depend on site-specific bioavailability.

Chromium:

If chromium is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Copper

Copper was detected at levels above the screening value in 31 of 76 samples. Overall, copper did not appear to be exceptionally elevated except in certain localities. These included Drydocks 3 and 4, the abrasive blasting area, the Cooper River south of Clouter Island, the base of Pier D, and the Zone E stormwater outfalls.

The highest concentration of copper (1,930 mg/kg) was detected in Sample 556-05 near the Drydocks 3 and 4. Sample 556-04 at the drydocks was also somewhat high at 156 mg/kg.

The abrasive blasting area (SWMU 54) had two samples (054-03 and 054-04) with concentrations in the 400 mg/kg range. A possible link to this SWMU is indicated by the fact that soil samples from SWMUs 21 and 54 were elevated in copper and arsenic.

The base of Pier D (AOC 555) also had elevated concentrations of cadmium and chromium. The concentration at the base of Pier D was 220 mg/kg. Nearby Outfall 27 may drain from Building 1119, the former galvanizing shop.

The Cooper River off the southern tip of Clouter Island had an elevated copper hit of 330 mg/kg in Sample CPR-20. Groundwater concentrations at AOC 694 were elevated in arsenic, cadmium, copper, cyanide, mercury, and silver with respect to Ambient Water Quality Criteria (AWQC). Copper should be kept in the risk assessment due to numerous exceedances of screening values and potential effects to benthic communities. The RFI report identified copper as a chemical of potential concern in all three water bodies.

The storm sewer Samples 699-02 and 699-04 had concentrations of 146 and 164 mg/kg, respectively. Groundwater concentrations adjacent to the sewer lines in Zone E (Zone L) were reported to have elevated levels of arsenic, copper, and chloroform.

Response:

If copper is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the

Effluent Evaluation and/or SLERA Reports.

Lead
Lead exceeded screening values in 14 of 76 samples. Lead was elevated in a few spots, which were also elevated in other metals. It exceeded the screening values by more than ten times at three locations including Outfall 23 (SWMU 54) and two AOC 699 Zone L storm water outfalls. The highest concentration of lead (996 mg/kg) was detected at Sample 699-04. The AOC 699 outfall is at the base of Pier E, across from SWMU 81, a former less-than-90-day accumulation area for hazardous wastes (including Outfall 30). Lead was also high at the base of Pier D in Samples 555-01 and 555-02. The base of Pier D samples include the AOC 699 Sample 699-02. The drydocks 3 and 4 location that was also high in copper (556-05) was moderately elevated in lead at 220 mg/kg. These localized areas warrant further investigation. Average concentrations of lead and other constituents in the Cooper River are not relevant to COPC elimination because they dilute the constituents into areas that are not providing the same type of habitat. Averages include areas of the main channel that are distant from Navy property, well mixed, and unlikely to accumulate constituents associated with fine-grained sediments.

Response:

If lead is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Mercury
Mercury is a concern in the abrasive blasting area. It should be retained for the investigation of SWMU 54.

Response:

If mercury is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Nickel
Nickel was elevated with respect to screening values at the base of Pier D, the abrasive blasting area, the drydocks, the Zone L storm sewer outfall at the base of Pier E, and at the AOC 695 former electric railroad. The highest concentration of nickel was 102 mg/kg in the stormwater outfall sample (699-02), at the base of Pier D. Also at the base of Pier D was Sample 555-01, with 28.7 mg/kg of nickel. Nickel was widely dispersed in the abrasive blasting area with concentrations of 42.4 and 35.7 in Samples 054-03 and 054-04, respectively. Nickel was somewhat elevated in the drydocks with 32.6 mg/kg at 556-05 and 18.3 mg/kg at 556-08. There was no direct evidence of nickel sources at any of the SWMUs or AOCs in the vicinity of sediment contamination. Nickel was somewhat elevated in the Zone L stormwater sample at the base of Pier E (699-04) with a concentration of 25.2 mg/kg. There were also nickel concentrations in the range of 17 mg/kg at AOC 695, the former electric railroad. Nickel should be retained for investigation of specific areas.

Response:

If nickel is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Silver

There is inconsistency in the representation of silver concentrations. The figure in Appendix B and Table 7-1 indicate exceedances of the screening value, yet concentrations in Tables 3-1 and 7-1 are below the screening level. Silver appears to originate from Zone G in the Figure in Appendix B, yet no discussion of this zone appears in the report. It was retained as a COPC because one detection limit exceeded the screening value. Silver is open for consideration pending clarification. Silver should be discussed for distribution and potential sources in the revised report.

Response:

If silver is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Zinc

Although zinc concentrations were below screening values in most samples, zinc has localized concentrations more than ten times above the screening values in the SWMU 54 abrasive blasting area, AOC 699 Zone L storm water outfalls, and Drydocks 3 and 4. There were three samples greater than ten times the screening values. Two of them were in the abrasive blasting area. The highest concentration of zinc was found in the abrasive blasting area at 054-04 (1,390 mg/kg). The second highest concentration of 1,250 mg/kg was found at Sample 699-02, near the base of Pier D and AOC 555 Sample 555-01. Sample 555-01 was also elevated at 277 mg/kg of zinc. Drydocks 3 and 4 had concentrations in the range of 443 and 774 for Samples 556-04 and 556-05, respectively. These areas warrant further investigation. The screening risk assessment for mussels predicts possible effects to bivalves for zinc.

Response:

If zinc is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Organotins

Organotin is recommended for further consideration due to infrequency of sampling. There is no screening value for this constituent. Effects data should be sought. Perhaps surface water sampling in areas where mixing by currents is less intense could be used to compare with the more abundant toxicity data for the water column.

Response:

As stated in the Zone J RFI Part One Report, only one of 61 samples had a detection for organotin constituent. Upon completion of the Zone E RFI and migration pathway evaluations, if it has been determined that an upland source of organotins exists within CNC, a risk management decision will be made to consider additional sampling for organotins.

Acetone

I would like to hear further discussion of acetone and the merits of the sampling equipment washing theory. Are there any sources of acetone in groundwater plumes? The highest concentration of acetone was at CPR-21 (4.1 mg/kg) by Pier K.

Response:

As a part of the decontamination process mentioned in *Preliminary Results of Zone J - Technical Memorandum (EnSafe, 1997)*, isopropyl alcohol was specifically used to rinse sampling equipment. Though the use of isopropyl alcohol is a common decontamination step, it does contain impurities such as acetone and at levels reaching 1% of the total weight. Insufficient use of a final distilled water/deionized water rinse can leave traces of acetone that may contaminate the samples. Though the rinsate blank analyzed identified acetone at a concentration less than 10 μg/l and the technical memorandum stated that sediment sample CPR-21 had a detection of 4.1 mg/kg, to date, the zone investigations have not identified an acetone plume at CNC. Therefore, the 4.1 mg/kg detection for acetone originating from CNC is suspect. Upon completion of the zone investigations, it is not expected that any source of acetone will be identified.

PAHs

PAHs should be retained as a constituent of concern especially in the drydocks. Areas with total PAHs at levels greater than ten times the screening value were the drydocks (especially Drydocks 3 and 4), the base of Pier D (555-01 and 699-02), the abrasive blasting area, and the base of Pier E Zone L stormwater outfall (699-04).

Response:

If any of the PAHs are determined to be Zone J COPCs, an effort will be made to determine if there are upland sources at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Phthalates

Phthalates, in general, do not seem to be associated with activities at the Shipyard. Diethyl phthalate is detected in one of 66 samples in Sample CPR-15. This sample was located off Clouter Island on the other side of the river from the Naval Complex. Other phthalates detected were bis(2-ethylhexyl)phthalate (BEHP), di-n-butyl phthalate, and di-n-octyl phthalate. The highest concentration of BEHP was detected at CPR-02, which is upstream of the Shipyard. A source of di-n-butyl phthalate was identified at AOC 675/676/677 in groundwater. The maximum hit of di-

n-butyl phthalate was at Sample 556-05 in Drydocks 3 and 4, which is far upstream of AOC 675/676/677 and does not appear to be related to the potential source.

Response:

If any of the phthalates are determined to be Zone J COPCs, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

SHIPYARD CREEK

The headwaters of Shipyard Creek experience the highest concentrations of copper, chromium, lead, mercury, nickel, zinc, as well as DDTs, aldrin, beta-BHC, PCBs, and PAHs. These constituents should all be retained for their possible impact to this area.

Arsenic

Arsenic is highest in SYC-17 at the southern base of the Dredge Material Area (DMA). Since the DMA has drainage channels to the south that contain arsenic, this potential source to the marshlands adjacent to the creek warrants further investigation. Arsenic should not be categorically disregarded. Arsenic was elevated in AOC 654 surface soils and nearby sediment locations. Numerous organics and inorganics were detected in soil and sediment at similar concentrations at SWMU 159 (Satellite Accumulation Area) in Zone H. The higher concentrations of arsenic, i.e., over 20 mg/kg, tended to be located in the southern part of the creek around the DMA on the side of the creek next to the CNC and on the opposite side. At SWMU 12 (Zone I) di-n-butylphthalate, arsenic, and nickel were significantly elevated in groundwater with respect to background and screening values. The report states on Page 3-22 that "One of the two dewatering outfalls from the dredge materials area in Zone I also discharges into the emergent wetlands along Shipyard Creek." These transport pathways need further clarification.

Response:

If arsenic is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. The arsenic memorandum presented to the CNC BCT project team by CH2M-Jones will be utilized when identifying arsenic COPCs. Clarification of transport pathways will be presented in the Effluent Evaluation Report.

Cadmium

The highest concentration of cadmium was detected in SYC-01, adjacent to AOC 654. AOC 654 is a former septic tank and leach field for Building 661 in the SWMU 9 boundary. Cadmium in soil was associated with AOC 654 and SWMU 9 groundwater. Cadmium is only elevated above the screening value in the one location. It is of concern only due to its association with AOC 654, which has surface soil with the potential to impact sediment at several locations, according to the text. The maximum detection is at SYC-01 with a value of 1.1 mg/kg.

Response:

If cadmium is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Chromium

This metal would apparently be of concern except for its identification as a COC at the neighboring SF site. It should be a chemical of concern at the Naval Shipyard Zone J also. Its impacts need to be assessed regardless of whether the source is the Navy. At least some of the chromium was probably contributed by the Navy, especially in the SWMU 9 area.

Chromium concentrations are highest at Sample 009-04, just downstream from SWMU 196. Concentrations in the creek above 009-04 are relatively low, including the three sample for SWMU 196. The closest potential source to 009-04 is SWMU 121, a building formerly used as a Satellite Accumulation Area. Several organic and inorganic constituents, including chromium, were elevated in SWMU 9 soil and corresponding SWMU 9 sediments. Apart from the elevated concentrations in Samples 009-04, 009-05, 009-01, SYC-01, and SYC-02, the chromium concentrations were fluctuating around the screening value, including the lower creek.

Response:

If chromium is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Lead

Lead is of potential concern in the upstream portion of Shipyard Creek. It may be associated with the former landfill at SWMU 9. Lead should be retained because it contributes to an area that warrants further investigation. Lead is elevated upstream of SWMU 121, beginning with a high concentration of 102 mg/kg at Sample 009-02, near SWMU 20. SWMU 20 is a former waste disposal/storage area–part of SWMU 9. Lead was elevated in both soils and groundwater in SWMUs 19, 20, and 121. The highest concentration was 107 mg/kg in sediments at Sample 09-04. The SWMU 9 sample in-between (009-03) and the downstream SWMU 9 sample (009-05) were also elevated in lead. The strength of the association with the SWMUs is not completely clarified.

Response:

If lead is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Mercury

Mercury should be retained for the same reason as lead. Mercury was elevated above the screening value in only five samples. They were all located in the headwaters of Shipyard Creek,

beginning at 009-03 with a concentration of 0.51 mg/kg and tailing off at 009-01 with a concentration of 0.16 mg/kg. The mercury concentrations are not particularly high. They are potentially associated with a SWMU 9 source of contaminated groundwater or soil.

Response:

If mercury is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Nickel

Nickel is distributed more widely through the Shipyard Creek. Nickel appears to be elevated with respect to background. It does not appear to be concentrated in any one spot or to be greatly elevated above screening values. It appears to be associated with both the SWMU 9 landfill and AOC 654 surface soils. Highest concentration was at Sample 009-04. Concentrations tended to be elevated downstream from 009-04 all along the CNC shore up to and including SYC-06. The pattern of contamination appeared consistent with association with SWMU 9 and AOC 654. Source control of these areas might provide a rational approach to address nickel in Zone J sediments. Its concentrations do not appear to drive biological testing.

Response:

If nickel is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Tin

There is no screening value for tin, but its concentrations appear high in Shipyard Creek relative to the Cooper River and Noisette Creek. Additional information on the significance of tin should be provided.

Response:

Information on the ecotoxicity of tin in benthic biota and the fate and transport of tin in the aquatic system will be reviewed and presented in the Effluent Evaluation and or the SLERA Report.

Zinc

Zinc did not exceed the screening values by much and was detected above the screening values in only a few samples from the headwaters of the creek. Highest concentrations of zinc were detected at 009-04 and 009-05 at 387 and 261 mg/kg, respectively. Only three samples were elevated above the screening values. It should be retained due to the need to examine the headwaters further. Zinc was detected at elevated levels in both SWMU 9 groundwater and soil and was detected at elevated levels in AOC 654 soils.

Response:

If zinc is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Chlorobenzene

I am concerned about the chlorobenzene, 2-methylnaphthalene and to a lesser extent the dichlorobenzenes in the vicinity of Sample 196-02. They appear to be associated with a groundwater plume from SWMU 196. Their presence in sediments indicates an ongoing source of groundwater discharge to sediments that needs to be addressed. The levels are elevated enough that they may be toxic to benthic organisms based on equilibrium partitioning theory, i.e., Region 5 sediment screening values.

Response:

Presently, CH2M-Jones is remediating SWMU 196 with source removal and then monitoring of the site with 13 additional monitoring wells to be installed. CH2M-Jones will provide sheet flow and groundwater migration pathway analysis at SWMU 196 for the chlorobenzenes and 2-methylnaphthalene constituents and determine if a problem still exists.

DDD, DDE, DDT, Aldrin

These constituents should be retained as chemicals of potential concern as was recommended by the report. Maximum concentrations of DDD, DDE, DDT, and aldrin were detected in Samples 009-04 and 009-05 near SWMU 196. DDT was detected in SWMU 9 groundwater and DDD, DDE, DDT were detected in SWMU 9 soils. Aldrin was detected in sediment only.

Response:

If DDD, DDE, DDT, and aldrin are determined to be Zone J COPCs, an effort will be made to determine if there are upland sources at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and /or SLERA Reports.

PAHs

Concentrations of total PAHs were highest at 009-04 at 77,100 mg/kg. The second highest sample was 196-01 at 15,219 mg/kg. The PAHs in the headwaters of Shipyard Creek appear to be associated with SWMU 9 landfill and SWMU 196. There are other locations in the creek with relatively high concentrations including SYC-08 at 9,010 mg/kg, SYC-20 at 7,350 mg/kg, and SYC-16 at 8,430 mg/kg. The lower/mouth Shipyard Creek samples with elevated PAH concentrations are not all on the CNC side of the creek, nor are they associated with apparent known sources. PAHs should be retained as COPCs. Surface soils from SWMUs 19, 20, and 121 and SWMU 159 were elevated in several PAHs.

Response:

If any PAHs are determined to be Zone J COPCs, an effort will be made to determine if there

is an upland source at CNC that can be linked to Zone J. The PAH background memorandum presented to the CNC BCT project team by CH2M-Jones will be utilized when identifying PAH COPCs. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

BEHP

Bis(2-Ethylhexyl)phthalate was detected at its highest concentration at SYC-01. It was associated with soils of SWMU 159 (Zone H), although possibly not at a very high concentration in the soils. This SWMU provided temporary storage of hazardous waste materials. BEHP should be considered further for sources.

Response:

If BEHP is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Dioxins and diethylphthalate

These constituents were detected at their highest concentrations in SYC-14, which is near a docking facility on the other side of the creek from the Navy. I am not recommending that these constituents be pursued further unless there were detection limit problems or some other uncertainty.

Response:

If diethylphthalate is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

NOISETTE CREEK

Ten samples were collected for Noisette Creek (NOI-01 through NOI-10). However, there are four sample points for SWMU 44 shown on Figure 3-2 that are not included in any of the tables. They may have had limited analysis. These samples should be included because they could help to define contamination coming from SWMUs 42 and 44.

Arsenic

Arsenic deserves further consideration for influence of grain size and organic carbon, because site and background concentrations are above screening values. It is highest in NOI-08 and NOI-02 both at 19.9 mg/kg. NOI-08 is located at the mouth of the creek. NOI-02 is located in the off-site marsh just downstream of the mouth of the tributary to the north. Analysis should be conducted to determine whether the arsenic is primarily associated with fine-grained sediments as I have described for the Cooper River. Arsenic does not appear to be associated with any discernable source. Data, however, are missing from SWMU 44. Sixteen metals including aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, vanadium, and zinc were detected in both surface soils and sediments of drainage ditches of SWMU 44 according to the report. The revisions should incorporate the

missing data for SWMU 44.

Response:

If arsenic is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. The data from all samples collected at SWMU 44 will be included in the data evaluation for possible site linkage. The arsenic memorandum presented to the CNC BCT project team by CH2M-Jones will be utilized when identifying arsenic COPCs. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Cadmium
Cadmium does not appear on Table 3-5, was it analyzed?

Response:

The Navy acknowledges that cadmium was inadvertently omitted from Table 3-5. When the SLERA report is submitted, all Zone J sediment data will be presented.

Chromium
Only one sample was greater than the screening value in NOI-02. It is not recommended for additional consideration unless the data for SWMU 44 show otherwise. Chromium is a chemical identified as a concern in SWMU 44 soil.

Response:

If chromium is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Copper
The highest concentration was detected in Sample NOI-04 at 127 mg/kg. This concentration was much higher than any of the other samples. Sample NOI-02 had the second highest value at 36.3 mg/kg. A wetland sample from near the mouth of the creek (NOI-09) also had a somewhat high value at 31 mg/kg. Several sources of copper have been identified.

Response:

If copper is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Lead
Lead is not exceptionally elevated in Noisette Creek. It is highest in NOI-04 near the mouth of the creek, where it is extensively distributed above the screening value. The wetland Samples NOI-08 and NOI-09 were the most elevated after NOI-04. The lead concentrations in NOI-08 and

NOI-09 were 59.1 and 62.6 mg/kg, respectively. Since several other metals were elevated at the creek mouth, this area may warrant further investigation. Lead is associated with SWMU 44 soils and sediments in drainage ditches.

Response:

If lead is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Mercury
Mercury's highest concentration was 1.2 mg/kg in NOI-02. Five samples exceeded the screening value. The wetlands at the mouth of the creek, NOI-05 and NOI-08, had the next highest concentrations, 0.24 and 0.28 mg/kg, respectively. Mercury is associated with soils of SWMU 44. I am not recommending that mercury be pursued any further in Noisette Creek. The tributary from the north to Noisette Creek, however, may require an additional upstream sample to complete the delineation.

Response:

If mercury is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Nickel
Nickel slightly exceeded its screening value in two samples. The highest concentration was detected in NOI-4. The second highest was detected in Sample NOI-02. Only these two samples exceeded the screening values. Nickel was identified as a groundwater-to-surface water chemical for SWMU 43 and a soil-to-surface water chemical for SWMU 44. The mouth of the creek may need to be investigated further due to elevated levels of copper, lead, nickel, and zinc. The primary concern near the mouth of the creek, however, is PAHs.

Response:

If nickel is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Zinc
Zinc may need further consideration due to its presence in a hot spot of metals at NOI-04 (718 mg/kg). Only three samples exceeded the screening value in Noisette Creek. The other two were NOI-02 and NOI-09 at 151 and 156 mg/kg, respectively. Zinc was identified as a groundwater-to-surface water chemical for SWMUs 42 and 43. It was identified as a soil-to-surface water chemical for SWMU 44. The uptake model into benthic macroinvertebrates predicted a possible risk to the benthic community.

Response:

If zinc is determined to be a Zone J COPC, an effort will be made to determine if there is an upland source at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

PAHs

The highest concentrations of PAHs in Noisette Creek rivaled those in Shipyard Creek. The highest total PAH concentration was in NOI-10 at 21,210 mg/kg. Following in higher concentrations were 9,710 mg/kg at NOI-09 and 8,878 mg/kg at NOI-04. NOI-10 is located at the mouth of the creek on the bank of the Cooper River in the shelter of Pier A. NOI-09 and NOI-04 are close to each other and also near the mouth of the creek. There are no SWMUs in this vicinity. There are several SWMUs upstream that could have associated PAHs. SWMU 42 is a former asphalt plant and AOC 505 includes an area used for storing creosote railroad ties. SWMU 44 is a former coal storage yard. PAHs should be retained as COPCs for Noisette Creek. PAHs in Noisette Creek need to be linked to potential sources where possible.

Response:

If PAHs are determined to be Zone J COPCs, an effort will be made to determine if there are upland sources at CNC that can be linked to Zone J. The PAH background memorandum presented to the CNC BCT project team by CH2M-Jones will be utilized when identifying PAH COPCs. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

PCB-1260 and BEHP

Aroclor-1260 and Bis(2-ethylhexyl)phthalate were detected only at NOI-03. Their detected concentrations exceeded screening values. A potential source should be sought. They may occur too infrequently to warrant further investigation unless there was difficulty with the detection limits.

Response:

If Aroclor-1260 and BEHP are determined to be Zone J COPCs, an effort will be made to determine if there are upland sources at CNC that can be linked to Zone J. Findings will be presented in the Effluent Evaluation and/or SLERA Reports.

Part 1: Charleston Naval Complex

Re: Robert E. Duncan
Environmental Program Director
SCDNR
Columbia, South Carolina

Dear Mr. Duncan:

The following provides our responses to comments (dated July 5, 2000) from SCDNR for the ecological aspects of Zone J Draft RFI Part 1: Charleston Naval Complex.

Comments:

1. The SCDNR has reviewed NOAA's comments on the RFI, and concurs in principle with all of their comments (see memo from Tom Dillon, dated June 5, 2000). With respect to the selection of appropriate background samples for comparison to the Cooper River RFI samples, the SCDNR agrees with NOAA that the use of maximum concentrations from Rathall Creek is inappropriate and seemingly arbitrary. Ideally, the background sampling site(s) should be similar in all respects to the Cooper River site, except with respect to contamination. It may, therefore, be more appropriate to use existing data (or to collect additional data, if necessary) from sites within the main stem of the Wando River, rather than from a relatively small tidal creek (such as Rathall Creek), for comparison to the Cooper River sites. We made a similar suggestion in our earlier comment letter on the *Ecological Risk Assessment Background Strategy, Draft Review Summary Report* (see letter dated January 15, 1998).

Response:

A risk management decision has been made by the CNC BCT project team to collect reference samples from outfalls that have discharge point similarities to the drainage basins at CNC and develop reference concentrations that would be compared to CNC effluent results. The Point of Entry Effluent Sampling Work Plan was prepared in response to this decision with the end purpose of determining constituent contribution from storm water runoff of CNC upland terrestrial units into storm water sewer lines and eventual discharge to the water bodies. Final reference concentrations and implementation of results will be discussed with the CNC BCT project team and trustees for Zone J before completing the SLERA.

2. The SCDNR also agrees with NOAA that there is an over-reliance on food web models to evaluate risk to ecological receptors, particularly aquatic species, and that assessment and measurement endpoints should be chosen in conformity with EPA guidance on conducting Ecological Risk Assessments (ERAs). We further agree that the blue mussel is an inappropriate species to use for assessing risks to aquatic species (either benthic or nektonic), and that risk to fish (both predator and prey species) should be evaluated as well. In addition, the SCDNR recommends evaluating risk to piscivorous mammals (e.g., mink or river otter), and using a piscivorous bird with a smaller home range than a blue heron (e.g., a green

heron).

Response:

A clam will be used instead of the blue mussel to evaluate risks to benthic macroinvertebrates. Additionally, a mink and a piscivorous bird with a smaller home range (such as the green heron or belted kingfisher) will be included as receptor species.

3. In Section 2.2.2 (*Other Investigations in the Cooper River*) and in Section 2.3.2 (*Other Shipyard Creek Investigations*), there are some notable omissions in the list of relevant studies conducted in the vicinity of the Charleston Naval Base. We specifically mentioned some of these studies in our earlier comment letter on the *Ecological Risk Assessment Background Strategy, Draft Review Summary Report* (see letter dated January 15, 1998). These include several studies sponsored by NOAA's "National Status and Trends Program" and EPA's "Environmental Monitoring and Assessment Program" (e.g., Ringwood *et al.* 1996 and 1997; Hyland *et al.*, 1996 and 1998; Long *et al.*, 1997); a study conducted for the USACE as part of an environmental evaluation of dredged material for the ongoing Charleston Harbor deepening project (Ward, 1996); the sediment sampling and analysis report for the proposed Daniel Island Terminal, which included sediment samples from the Cooper River near the Charleston Naval Base, as part of the Alternatives Analysis (EA Engineering Science and Technology, Inc., 1999); and numerous sediment testing reports conducted by various applicants to perform new work or maintenance dredging in the vicinity of the Charleston Naval Base (e.g., the Charleston Naval Complex Redevelopment Authority, P/N # 98-1T-219-P). Several of these studies showed exceedances of sediment quality criteria, significant toxicity, evidence of degraded benthic communities, and/or significant bioaccumulation of contaminants at various sites in the Cooper River and Shipyard Creek. The SCDNR can provide complete citations for these reports, if necessary. We recommend that these studies be included in the sections summarizing the existing data, and that complete literature citations be provided for all of the studies cited (many cited in the text do not have corresponding citations in the list of References, Section 8).

Response:

The Navy requests that SCDNR provide the complete reference citations for the above-mentioned studies. Upon review of these additional studies, the information will be discussed in the SLERA report. Additionally, complete reference citations for the studies cited in the text of the report will be included in the References section of the SLERA report.

4. Finally, the SCDNR is concerned that no groundwater or soil samples were collected at several SWMUs that are listed as potential sources of contamination to the Cooper River or Shipyard Creek. As stated in the RFI, this effectively precludes an evaluation of soil-to-groundwater, soil-to-sediment, and groundwater-to-surface water migration pathways. The RFI should state how these potential migration pathways will be addressed, in order to ensure that any continuing sources of contamination to the adjacent water bodies are identified and eliminated.

Response:

The present strategy for Zone J is to evaluate the storm water sewer system, sheet flow and groundwater migration pathways, develop COPC lists, and attempt to link the identified COPCs to upland terrestrial units. The findings will be addressed in the Effluent Evaluation Report and the SLERA. SMDPs will be made during the SLERA process to decide the direction of the Zone J RFI based on the outcome of the SLERA.

Project Manager

Subject: Risk review comments for ecological aspects of Memorandum from Todd Haverkost, P.G. to Mihir Mehta, SCDHEC, and Dann Spariosu, USEPA, Regarding the Iron Concentrations at Charleston Naval Complex (CNC) and Zone J Eco Screening Levels, dated January 25, 2001

From: Sharon R. Thoms, Life Scientist
Office of Technical Services
Waste management Division

To: Dann Spariosu, Remedial Project Manager
Base Realignment and Closure (BRAC) Team
Federal Facilities Branch
Waste Management Division

Per your request on January 25, 2001, I have reviewed the Memorandum from Todd Haverkost to SCDHEC and EPA on the iron concentrations at Charleston Naval Complex (CNC), dated January 25, 2001. My comments provided below are divided into comments to you the RPM and comments for the party preparing the report, which if you concur can be forwarded to the Navy. I will forward you my memo via Lotus Notes to facilitate verbatim conveyance.

Comments to the RPM

The following comments are to facilitate your decision regarding treatment of iron in the ecological risk assessment. There are two questions which pertain to iron, (1) is it present at elevated concentrations in CNC soils and (2) can iron found at elevated levels migrate to other environmental media or cause adverse effects in terrestrial biota.

The first question regarding whether iron is elevated with respect to background can be evaluated based on comparison with either the 2-times-average background (preferred) or the 95 percent Upper Tolerance Limit (UTL). If this comparison results in only a few data points within the zone falling above background or if there are several data points above background but they are only slightly elevated, then you might consider the iron concentrations to be representative of background. If you need a better method of resolving this issue, you could request a more complete statistical analysis.

For zones where iron is clearly elevated in soils, an evaluation of the potential for iron to leach off the soil can address the ability of the iron to migrate to groundwater or to migrate into Zone J. Not only does insoluble iron not leach, but it generally is non-toxic to soil invertebrates and does not accumulate in fish or wildlife tissues. The site-specific geochemistry, specifically the soil pH, may address the question of iron solubility. Neutral soils will prevent iron from dissolving. This evaluation would require knowledge of the pH of CNC soils.

Comment For Party Preparing The Risk Assessment

Only one comment is provided on the memorandum dated January 25, 2001. As background to the comment, the screening criteria provided in the memorandum are repeated in the order given,:

1. Zone-specific background (inorganics and select PAHs)
2. USEPA Region 4 SSVs
3. PRGs for sediment, Oak Ridge National Laboratory
4. ESVs from Savannah River Site

Region 4's screening approach is to consider background after, not before, screening for potential toxicity. Zone-specific background screening should be the fourth consideration.

For chemicals that lack screening values, rather than using the ORNL PRGs, Region 4 has recommended use of the Region 5 EDQLs. The Region 5 EDQLs may be viewed at the following website: http://www.epa.gov/reg5oopa/rcra/edql.htm

The ESVs from the Savannah River Site are the same as the Region 4 soil screening values. Consideration of the SRS screening values will not add any new values to aid the Navy in screening environmental media at the CNC.

Response:

The Navy acknowledges that Region 4's screening approach is to consider background after and not before screening for possible toxicity, but the CNC BCT has made a risk management decision that background/reference values would be the first step in the screening criteria process. The Zone J RFI process is to determine the Navy's contribution to the potential contamination of the Charleston water bodies and then perform a SLERA on the data gathered from the migration pathway evaluations and the data generated from samples collected in the Charleston water bodies.

Upon further review of ESVs from Savannah River Site and Region 4 soil screening values, it was noted that there were some similarities between the documents, with the majority of the values for SRS being more conservative. But there were several values included in the Region 4 soil screening criteria that did not appear in the ESVs from Savannah River Site, such as aluminum, beryllium, iron, manganese, selenium, thallium, and carbon tetrachloride to name a few. Therefore, we suggest that Region 4 soil screening values remain as the last criteria to fill any potential data gaps in the screening criteria.

SUBJECT: Risk review comments for ecological aspects of Memorandum from EnSafe, Regarding the Scoping Package for Work Plan Addendum to Sample Zone J Probable Points of Entry for Charleston Naval Complex (CNC) and Zone J, Dated April 4, 2001

From: Sharon R. Thoms, Life Scientist
Office of Technical Services
Waste management Division

To: Dann Spariosu, Remedial Project Manager
Base Realignment and Closure (BRAC) Team
Federal Facilities Branch
Waste Management Division

Per your request on April 24, I have reviewed the **Memorandum from EnSafe providing the Work Plan Addendum to Sample Zone J Probable Points of Entry to Zone J at Charleston Naval Complex (CNC), in Charleston, South Carolina, dated April 4, 2001.** My comments provided below are divided into comments to you the RPM and comments for the party preparing the report, which if you concur can be forwarded to the Navy. I will forward my memo via Lotus Notes to facilitate verbatim conveyance.

GENERAL COMMENTS TO THE RPM

The purpose of the memorandum was to characterize storm water mediated releases from Charleston Naval Complex (CNC) in an effort to identify potential migration of site-related constituents. The end result will be a refined list of chemicals of potential concern (COPCs) for Zone J. The refined list will consider the likelihood that a chemical identified as a potential concern in sediment can be attributed to Naval operations at the CNC.

When presenting the comments to the Navy, please remember to distinguish the comments from State and NOAA from EPA's comments. Please forward the responses to comments for OTS' files.

COMMENTS TO BE CONVEYED TO PARTY PREPARING THE REPORT

GENERAL COMMENTS:

1. The approach taken by the Navy is proactive in addressing potential migration of chemicals in surface soil and groundwater to Zone J water bodies. The results of this study should be transferred to the future owners of the property to assist them in ongoing efforts to manage storm water at CNC.

Response:

Comment noted.

2. The work plan acknowledges that there are potential diffuse areas, i.e, non-point sources,

and non-point source pollution involves the nature of pollutant origin rather than the nature of chemical pollutants.

Response:

The Navy agrees that there is a distinction between point and non-point source pollution and that storm water has the potential to transport both site related contaminants and non-point source pollutants to Zone J water bodies. *The Point of Entry Effluent Sampling Work Plan Section 1.2 Sources of Pollutants to the Charleston Harbor* will include the following text: "Point source pollution is defined as pollution discharged from a well-defined location, such as discharges from industrial processing waters, concentrated animal production, or fruit and vegetable processing facilities or the effluent from sewage treatment facilities. Non-point source pollution comes from diffuse, numerous sources. Runoff occurring after a rain event may transport sediment from plowed fields, construction sites, logging operations, pesticides and fertilizers from farms and lawns, motor oil and grease deposited on roads and parking lots, or malfunctioning septic systems. Nine categories of nonpoint source pollution that impact South Carolina waters are: agriculture, forestry, urban areas, marinas and recreational boating, mining, hydrologic modification, wetlands, disturbance, land disposal/groundwater impacts, and atmospheric deposition." Runoff associated with CNC represents non-point source discharge because of the concern with the possible transport of contamination from existing sediments and groundwater at listed AOCs/SWMUs.

SCDHEC manages their Point Source Program for industrial facilities through a NPDES program, and the State manages agricultural facilities through a State permitting and inspection program requiring recycling or land application of agricultural wastes, which eliminates the need for direct surface water discharges of agricultural wastes. The State manages their nonpoint source program through the South Carolina Nonpoint Source Management Program. (*The State of South Carolina Water Quality Pursuant to Section 305(b) of the Federal Clean Water Act, Fiscal Year 2000 Report*).

Types of contaminants in storm water runoff from CNC may be similar to contaminants associated with urban and civilian industrial use. According to the report *Review of Nonpoint Source Pollution and Best Management Practices Along the South Carolina Coast, D. Mack Kelly, Jr.*, SCDHEC in 1989, identified a list of constituents that were characteristic of nonpoint source pollutants common to South Carolina. Included in the list were constituents common to CNC investigations such as cadmium, chromium, copper, lead, mercury, nickel, zinc, aldrin, DDT, dieldrin, endrin, heptachlor, toxaphene, SVOCs, and VOCs.

2. Background, pages 1-2. The section on the ecological screening values and their order of preference does not replicate the order that I had provided in my February 12, 2001 memo. As background to the comment, the screening criteria provided in the memorandum are repeated in the order given:

    1. Zone-specific background (inorganics and select PAHs)
    2. USEPA Region 4 SSVs
    3. PRGs for sediment, Oak Ridge National Laboratory

4. ESVs from Savannah River Site

Region 4's screening approach is to consider background screening after, not before, screening for potential toxicity. Zone-specific background screening should be the fourth consideration.

Response:

The Navy acknowledges Region 4's screening approach to consider background screening after, not before, screening for toxicity, but the present CNC BCT project team strategy is to determine CNC's contamination contribution to the water bodies and compare the results to other non-regulated off-site releases. Agreed upon reference values will be calculated and compared to the data collected from CNC related locations. If it has been determined that CNC effluent releases are below that of surrounding off-site releases, then effluent COPCs will not be identified. If CNC effluent releases are above surrounding off-site releases, then COPCs will be identified, and further evaluation of the data will be conducted to document whether an upland source is contributing contamination to the water bodies and to a possible linkage to sediment COPCs.

3. EPA considers comparisons with background values to be a risk management consideration rather than part of risk assessment.

For chemicals lacking screening values, rather than using the ORNL PRGs, Region 4 has recommended use of Region 5 EDQLs. The Region 5 EDQLs may be viewed at the following web site:
http://www.epa.gov/reg5oopa/rcra/edql.htm

Response:

The Navy concurs that comparisons to background values is a risk management consideration rather than part of risk assessment. The table below lists the screening criteria for sediment, soil groundwater, and effluent media. The inclusion of Region V Ecological Data Quality Levels Screening Values has been made per your request.

Sediment/Surface Soil	*Shallow Groundwater*
1. *Zone-specific Background (inorganics and selected PAHs Only)* 2. *Sediment Screening Value (SSV, USEPA Region IV)* 3. *Ecological Data Quality Levels (EDQL) Screening Value (USEPA Region V)* 4. *Savannah River Site data base* 5. *Preliminary Remediation Goal (PRG) for sediment (Oak Ridge National Laboratory)* 6. *Ecological Screening Value for Soil (USEPA Region IV)*	1. *Zone-specific Background (inorganics and selected PAHs Only)* 2. *Chronic Saltwater Water Quality Screening Values (USEPA Region IV)* 3. *Acute Saltwater Water Quality Screening Values (USEPA Region IV)* 4. *Ecological Data Quality Levels (EDQL) Screening Value (USEPA Region V)* 5. *Maximum Contaminant Levels (MCL) for Groundwater* 6. *Criteria Continuous Concentration (CCC) for Marine Surface Water (USEPA Water Quality Criteria)* 7. *Criteria Maximum Concentration (CMC) for Marine Surface Water (USEPA Water Quality Criteria)* 8. *NOAA Screening Quick Reference Table (SQRTs) for Marine Surface Waters*
Effluent Samples	
1. *Reference Concentration (inorganics, SVOCs, pesticides, PCBs)* 2. *Ecological Data Quality Levels (EDQL) Screening Value (USEPA Region V)* 3. *Maximum Contaminant Levels (MCL) for Groundwater* 4. *Criteria Continuous Concentration (CCC) for Marine Surface Water (USEPA Water Quality Criteria)* 5. *Criteria Maximum Concentration (CMC) for Marine Surface Water (USEPA Water Quality Criteria)* 6. *NOAA Screening Quick Reference Table (SQRTs) for Marine Surface Waters*	

4. Some of Navy's potential contribution to water quality or sediment impacts may be diffuse if contamination is spread out over a relatively large area. The work plan includes measurement of contaminants in sheet-flow runoff areas identified on Figures 4 through 10. Whereas there is no recognized outfall or ditch in these areas, how will samples be collected? The example Basin 44 did not address this issue.

Response:

The present strategy for the Point of Entry Effluent Sampling Work Plan is to collect just discharge samples from the storm water sewer system and ditches throughout CNC that are associated with a AOC/SWMU. While the effluent evaluation is being completed, CH2M-Jones will be evaluating sheet flow runoff migration pathway potential from upland AOCs/SWMUs and will identify possible COPCs. Once the effluent evaluation is complete, EnSafe will determine the necessity to collect sheet flow runoff samples below the mean high tide water mark. Areas with soil, grass or gravel ground cover will be evaluated to collect sheet-flow runoff and a sample will be collected from sheet-flow runoff before storm water enters the water body, when possible.

5. It will be important to pick the reference sites appropriately. The mass of constituents coming off a watershed will depend on the size of the watershed as well as antecedent conditions and rainfall pattern. Sediment delivery ratios decrease as a function of watershed size. It would be best if the reference watersheds were of similar size to the study watersheds at CNC and if site and reference outfalls were sampled for the same storms. The drainage basins at CNC differ in size. These complexities will need to be factored in when choosing appropriate reference sites and in interpreting the data. The work plan should expand the discussion of reference sites.

Response:

The Navy had every intention of identifying off-site reference locations that were within similar size of the drainage basins and present the findings in the Point of Entry Effluent Sampling Work Plan, but discussions with the Cities of Charleston, North Charleston, Town of Mount Pleasant, and Berkeley County Public Works officials revealed that present drainage basin sizes were for the most part larger in size than the drainage basins found at CNC. Obviously, data collected from the off-site locations will have to be reviewed relative to the CNC effluent data the differences in size will be taken in to account when reviewing data.

6. The analysis of the storm water inputs will only address continuing or ongoing sources of contamination but will not address past releases or spills. The discussion of the individual areas should include a discussion of any known or potential spills in past Naval operations. The example for Basin 44 did address this issue.

Response:

The history of known releases will be presented in the Effluent Evaluation and / or SLERA Reports.

7. If there is groundwater discharge to storm water outfalls through a leak in the pipe or through illegal connections, there may be some contamination detected in flow between storms. Some of the work to identify possible illegal connections is mentioned in the work plan. More detail would be beneficial.

Response:

During site reconnaissance of the storm water sewer system when rainfall was not occurring, a small amount of water flow was noticed in the lines at two locations. This occurred at manholes 20/7 and 28/13/3 and it could not be immediately determined if the flows were due to cross connects or groundwater infiltration. More information will be provided in the Effluent Evaluation Report regarding known cross connects and groundwater infiltration into storm water sewer system lines.

8. Also, potential non-point sources associated with Navy and non-Navy ship traffic and marina operation are not included in this approach. The work plan should either explain certain limitations of the study or try to enhance the study to include, for example, comparisons of sediment samples from Navy and non-Navy docks/marinas.

Response:

In the proposed upcoming work, outlined in the Point of Entry Effluent Sampling Work Plan, two of the selected reference locations are to be collected at the Ashley and City Marinas on the Ashley River. The scope of the work plan is to evaluate effluent discharges being released from CNC into surrounding water bodies and does not include the comparisons of sediment samples from Navy and non-Navy docks/marinas. Sediment data collected for the Zone J RFI Part One Report will be evaluated and presented in the SLERA, which will also include the effluent and groundwater pathway COPCs. SMDPs will be made during the SLERA process to decide the direction of the Zone J RFI, which may include additional sampling if the CNC BCT project team feels it is warranted. As for non-point sources associated with Navy traffic, additional information maintained by the Charleston Naval Shipyard environmental office, Code 106, will be provided in the Effluent Evaluation Report regarding reported spill/oil releases occurring in the water bodies surrounding CNC from 1982-1994.

9. If soils are being screened for the pathway analysis, indicate that risk of soils was evaluated in the risk assessments for the individual SWMUs and that this analysis is for potential future risk from migration of soils, assuming that soils can wash off the land and be transported to Zone J to become sediments. This might explain why soils are being screened against sediment ESVs. Please clarify rationale for the proposed approach.

Response:

The Navy acknowledges that soils are screened for pathway analysis it is for potential future ecological risk assessment to the migration of soils being transported to Zone J water bodies to become sediments. The scope of the Effluent Evaluation Report is to determine COPCs from the stormwater sewer line discharges and evaluate upland terrestrial units to establish a linkage to a possible source. As part of the evaluation, soil data that exists within a SWMU/AOC will be reviewed to determine the likelihood of contaminant migration to Zone J water bodies. This is true for the sheetflow and groundwater pathway analyses as well.

COMMENTS ON DATA COLLECTION AND ANALYSIS:

Both the collection and analysis of the data from this study are important aspects of the work plan,

which require expansion of details.

1. In terms of collection of the data, the work plan should provide the number of samples to be collected and how these samples will be structured. For example, will all of the reference samples be pooled into one data set, or will there be reference samples for different characteristics, such as industrial versus non-industrial watersheds? For each drainage basin shown in pink on Figure 4 through 10, will multiple outfalls within each area be pooled or will each outfall be analyzed separately? How many replicates will be taken at each outfall? How many storms will be sampled?

Response:

The Zone J Point of Entry Effluent Sampling Work Plan addresses the number of samples, reference locations, and analytes of concern. A defined statistical approach to reference concentration values has not been decided by the CNC BCT project team. The BCT team feels it is premature to settle on an approach now, since data has not been collected and results not reviewed. Once the data for the reference locations have been evaluated, the Navy will submit a statistical approach for the reference concentration values for review.

2. What parameters will be compared between the sites and reference outfalls? Can the flow-weighted concentrations be compared directly, or is it more appropriate to compare the loading rates per hectare, which may better account for differences in sizes of the drainage basins?

Response:

CNC effluent discharge and off-site reference location samples will be analyzed for the same set of parameters. It has been discussed that loading rates be compared per hectare, but final decision will be made by the CNC BCT project team.

3. Flow-weighted composite samples may be insufficient because studies have shown that most non-point pollution comes off in the first flush. Text states that it is possible to collect data the first 30 minutes of a storm. The Navy should make every effort to include the first 30 minutes after start of precipitation in their sampling. It is important to capture the entire storm but especially the beginning of the runoff event.

Response:

Reasonable efforts will be made to include the first 30 minutes after start of precipitation for sampling.

4. There will be dissolved and suspended particles associated with the stormwater runoff. Will the samples taken be filtered or unfiltered? EPA recommends a minimum of total recoverable metals samples. Additional details of the sampling strategy should be provided.

Response:

The collection of unfiltered samples are planned for the Point of Entry Effluent Sampling Work Plan samples.

COMMENTS ON OUTLINE OR ORDERING OF APPROACH:

As a general comment, EPA policy recommends that risk management be clearly differentiated from risk assessment. The following comments are suggestions to the outline for how to separate risk assessment from risk management. Although important, the evaluation of contamination associated with the unique characteristics of Naval operations is a risk management consideration that is separate from an evaluation of how the contamination may affect the environment.

1. To separate risk assessment from risk management, I recommend that the sorting of Navy and non-Navy contamination occur within or, better yet, after ecological risk assessment Step 3a, the refinement of chemicals of potential concern. I recommend that the current Steps 1 and 2 be preserved as the ecological risk assessment. The screening-level ERA should proceed on all of the Zone J samples. If new samples below the outfalls are collected, these samples should be added to the existing screening document. For convenience, they could be presented in a separate table for outfalls.

Response:

As stated in previous responses, the present strategy for the Zone J RFI is to analyze the potential migration pathways starting with the CNC storm water sewer system pathway prior to completing a SLERA. The CNC BCT project team decided that it was premature to evaluate risk assessment on constituents identified in the Part One Report without understanding the possible source of those constituents. The evaluation of the stormwater pathway also includes the determination of reference concentration values of site and off-site samples whose drainage areas are similar in landuse as the drainage basin areas at CNC. The CNC BCT project team decided that these reference values were needed to understand the contaminant contribution from other non-CNC potential sources to the Charleston water bodies. The CNC effluent results will be compared to the reference values according to the present CNC BCT background procedure. Following the directions of The CNC Project Team Notebook and Instructions for COPC Screening and Process, in order for a chemical to be considered a COPC, the chemical concentration must exceed both the background and relevant regulatory values. If no background value is available for a chemical, then it's concentration must exceed the regulatory value.

2. The outline shown on pages 7 and 8 appears to indicate that the process of evaluating risk at the CNC will start by sorting Navy contamination from non-Navy contamination and that apparently only the Navy contamination will be evaluated in the risk assessment. It is EPA's policy to evaluate the baseline risk attributable to all of the contamination present, natural plus anthropogenic.

Response:

Please refer to response to Comment # 1 for COMMENTS ON OUTLINE OR ORDERING OF APPROACH.

3. The ecological risk assessment Steps 1 and 2 should involve screening of COPCs for their potential to cause unacceptable adverse effects to exposed biota, regardless of the chemicals's association with Naval operations. In steps 1 and 2 sediments should be screened with the ESVs in Region 4's guidance. The discussion of reference locations and other sources of contamination should occur after the screening-level toxicity evaluation, i.e., after Steps 1 and 2.

Response:

The data associated with the sediment samples collected in the Cooper River, Shipyard Creek, and Noisette Creek will be evaluated and screened for COPCs regardless of the reference location data that is to be collected under the Point of Entry Effluent Sampling Work Plan. Reference location effluent data will be compared to only the CNC effluent pathway results with sheet flow and groundwater migration pathways being evaluated for possible releases to water bodies as well. All three pathways will be evaluated for COPCs, upland terrestrial units source linkage and possible linkage to sediments found in the water bodies. Once an established COPC list is finalized, a SLERA will then be completed to determine the next phase of the RFI.

4. Waters collected in stormwater sampling should be screened in Step 2 against screening values for saltwater or freshwater, depending on the receiving water body. The results of Steps 1 and 2 will be refined in Step 3.

Response:

Storm water data will be screened using criteria appropriate for the receiving water body.

5. The reference stations should not be screened against the ESVs.

Response:

Reference location sampling data will not be screened against ESVs.

The following comments are recommendations for Step 3a.

6. A comparison of site samples with non-anthropogenic background should be the first part of the refinement of COPCs in Step 3a. The refinement for naturally-occurring metals in sediments against background is different from distinguishing Navy and non-Navy sources. The discussions of background should be kept separate from the discussion of Navy-made sources and non-Navy- made sources.

Response:

The Navy acknowledges that it is Region 4's policy to introduce background values after initial screening against ecological values has been performed and an initial COPC list is complied. The Zone J RFI is a unique investigation that has transformed and developed into a complex project since the submittal of the *Zone J RFI Final Work Plan (EnSafe, 1996).* The initial phase of the Zone J RFI was the collection of sediment and surface water samples in the water bodies surrounding CNC near some of the suspected effluent discharge points and developing a preliminary COPC list and ERA. The results were presented in the Zone J Draft RFI Report Part One (EnSafe, 2000), which led to comments and concerns on the appropriate direction the RFI should take. The decision of the CNC BCT was to evaluate the possible migration pathways, develop a COPC list, evaluate upland terrestrial units' RFI data for possible source linkage and then perform a SLERA on all of the data evaluated and collected to date. This decision included the evaluation of effluent results from similar non-CNC discharge points to the surrounding water bodies and not to use pristine background samples to compare to CNC effluent discharge data prior to development of a COPC list. This strategy will inform the BCT of the Navy's contribution to the contamination of the water bodies. Any associated risk found in samples that can not be linked to a Navy source will be evaluated separately by the CNC BCT.

7. The refinement in Step 3a should also consider ESVs other than Region 4 values, for example, when a chemical lacks a Region 4 ESV. (see hierarchy in General Approach Comment Number 2.) The surface water data from outfall sampling (storms) should be screened against acute toxicity values in Step 3a, assuming that the concentrations will only be elevated during a storm runoff event. If filtered water samples are collected in addition to total recoverable, they are considered during Step 3a using the National Recommended Water Quality Criteria for dissolved water samples. (http://www.epa.gov/ostwater/standards/wqcriteria.htm).

Response:

Please refer to the table in General Approach Response # 2 for the screening level hierarchy. Also, only unfiltered samples will be collected for the stormwater system effluent sampling program.

8. The same refinement tables as presented previously should be included in the Step 3a, i.e., tables of frequency of detects, frequency of detects above ESV, etc., as recommended by Tom Dillon. Any new data for sediments and surface water collected at outfalls might be included in its own table, for convenience.

Response:

Comment noted.

9. The end of Step 3a may include an evaluation of other factors a risk manager may desire to consider, such as discussion of points of entry and other material related to whether the contamination may have originated from Naval operations. The migration pathway checklist and evaluation are recommended to take place after the more traditional screening approach to limit the chemicals of potential concern subject to analysis to a manageable number. This

approach would in effect limit the point -of-entry assessment to only those contaminants that are of potential concern in sediment, as was agreed to by DHEC.

Response:

As stated in previous responses, the present strategy for the Zone J RFI is to implement the Point of Entry Effluent Sampling Work Plan and evaluate the stormwater pathway migration results. If it has been determined that a particular constituent is listed as a COPC, an attempt will be made to link that COPC to an upland terrestrial source using the migration pathway checklist. Additional information will be evaluated such as dredging activities in the water bodies as well as the hydrodynamics of the Charleston water bodies and how it relates to discharges from CNC. The stormwater effluent evaluation process will be documented and presented in the Zone J Effluent Evaluation Report and submitted to all interested parties. A SMDP is likely to take place at this phase of the RFI. Concurrent to the stormwater system migration pathway evaluation, CH2M-Jones will be evaluating the sheetflow and groundwater migration pathways to determine if additional COPCs have been identified that may migrate to the Zone J water bodies. During the SLERA process, COPCs from the three pathways will be compared to the COPCs in the sediment data to establish a possible linkage. Upon submittal of the SLERA, a SMDP will take place to decide the next phase of the RFI.

COMMENTS ON STATISTICS:

1. *Section 1.0 Calculation of Background Iron Concentrations for Chas. Naval complex, Page 1.* Region 4 of EPA recommends the use of the Wilcoxon Rank Sum test for evaluating whether site concentrations are generally higher than background or slippage test for testing against background when a few samples from the site are elevated with respect to background. EPA is concerned that the distribution of contamination at the study site may not be the same as the distribution at the reference site, invalidating the UTL test assumptions. After the number of samples to be collected is established the consultant should contact EPA for specific recommendations on the statistics for comparing reference sites. Please contact Ted Simon at EPA at (404)562-8642.

Response:

Presently, the CNC BCT project team has decided that the iron background issue will be decided on a case by case scenario basis depending on effluent discharge results and possible upland terrestrial source linkage evaluation. If the CNC BCT team does consider iron to be of particular concern, all trustees of the Zone J RFI will be notified has to how reference concentration values will be determined.

SPECIFIC COMMENTS ON BASIN 44 EXAMPLE:

1. Figure 2.4.2 shows the catch basins and the samples for the SWMU/AOC investigations that are located near Basin 44. There are some samples, such as 636SB003, that are located directly across a parking lot from the catch basins. It is possible that precipitation falling on the grassy area will generate sheet flow, and the sheet flow will run onto the grassy area to the catch basin. Parking lots offer little opportunity for pollutant removal. Therefore, some of the samples near the 44/1-D and 44/1-B are candidates for the analysis of scenario 1b, waste in sheet flow collected at catch basins. I am recommending that the radius of 50 feet be relaxed to the extent that the distance between the sample and the catch basin is paved.

Response:

Collection of effluent discharge from the stormwater sewer system around Drainage Basin 44 will capture any contaminant from sheet flow around the catch basins in question. The 50 foot radius was introduced in the scoping package as a generic distance for possible source location that may migrate to a release point. When reviewing data for possible upland source linkage, the type of terrain that is present will determine the actual distance a contaminant may migrate to the release point.

2. Catch-basin sampling might be the most direct and efficient way to address question 1b. However, concentrations of constituents in catch basins are likely to be higher than ESVs. ESVs are probably not appropriate for evaluating sediments from catch basins. If enough catch basins can be found without CMCOPCs in the vicinity (and not across the parking lot from samples with high concentrations of CMCOPCs), it might be possible to compare "background" concentration levels in potentially impacted catch basins.

Response:

Presently, the next phase of the Zone J RFI is to collect effluent discharge samples from the storm water sewer system to assess possible contamination to the water bodies through that particular migration pathway. If COPCs are identified, upland terrestrial data will be reviewed to determine a possible source. Sediment sampling of catch basins are not being considered at this time until all other possible sources of COPCs identified are reviewed.

3. *Comparison of groundwater concentrations with background.* You may consider presenting this information in a table. Also include how many detections were within the range out of how many samples.

Response:

Comment noted.

4. If the Navy was concerned with potential future groundwater migration to the storm sewer lines, they would have to look at whether there was a groundwater plume moving toward the depression. (This is assuming that the depression is associated with a leak allowing infiltration into the storm sewer line.) Drilling wells may be the most direct means of measuring a groundwater depression, however, one might consider sampling water flowing into the catch

basin during base flow. Water should not be flowing into the catch basin between storm events unless groundwater leakage is occurring. If there was water entering the catch basin at base level, i.e., between rain fall events, one might sample the water to see if it contained any COPCs above the benchmarks.

Response:

Groundwater infiltration into the storm water sewer system is a possible migration pathway scenario for Zone J. If COPCs are identified in the effluent discharge samples, it is very likely that groundwater data from upland terrestrial units will be evaluated to determine a possible source. The final responsibility to determine if groundwater contamination is releasing to Zone J belongs to CH2M-Jones, who is responsible for groundwater at CNC beyond the mean high water tide.

5. If a catch basin was experiencing both sheet flow and shallow groundwater inputs, one could distinguish these by sampling water entering a catch basin during and immediately after a storm to construct a graph of pollutant concentration over time after a storm event. Contaminants from sheet flow will show up as an early peak in the graph while contaminants in shallow groundwater infiltration will show up as a delayed peak. This is a suggestion that may be performed, as necessary, to address a complex situation.

Response:

If both sheet flow and groundwater infiltration were possible pathways for a particular drainage basin sewer line, it may be difficult to explain from where actual contamination migrates. During dry weather site reconnaissance of the stormwater sewer system for CNC effluent discharge locations, there were only two locations that had some type of water flow observed in the catch basin flowing toward the outfall. At manhole 20/7, along the #20 stormwater line, a swift flow of water was observed heading toward the outfall. The elevation of the sewer line was at approximately seven feet, but groundwater elevation is around 10 feet. Groundwater infiltration is not likely here. Along the #28 storm line, it was observed at manhole 28/13/3 that a separate pipe exists approximately five feet down from the top of the manhole, and a slow flow was observed coming from beneath the pipe and going into the main line. Groundwater elevation in the area is approximately 10 feet; therefore, groundwater infiltration is not likely here.